pp. 1-60] [January, 1942

TROPICAL DISEASES BULLETIN

VOL. 39.] 1942. [No. 1.

IMPERIAL MYCOLOGICAL INSTITUTE
30 JAN 1942

Main Contents :

SUMMARY OF RECENT ABSTRACTS
I. CHOLERA.

HELMINTHIASIS.

MALARIA.

AMOEBIC DYSENTERY AND OTHER INTESTINAL PROTOZOAL INFECTIONS.

BACILLARY DYSENTERY.

YAWS AND SYPHILIS.

SPRUE.

MISCELLANEOUS.

For detailed Contents see pp. ii, iv, & vi.

Issued under
the Direction of the
Honorary Managing Committee of the
BUREAU OF HYGIENE AND TROPICAL DISEASES,
Keppel Street, London, W.C.1.

[Price 2/6 Net. *Entered as Second Class Matter in the U.S.A. Post.* [Annual Subscription 21/-.

HONORARY MANAGING COMMITTEE

APPOINTED BY THE SECRETARY OF STATE FOR THE COLONIES.

Chairman:

A. G. H. Smart, C.M.G., M.B.E., M.D., D.P.H., D.T.M. & H.
(*Chief Medical Adviser to the Secretary of State for the Colonies*).

Wm. Horner Andrews, D.Sc., M.R.C.V.S.

Sir Wilson Jameson, LL.D., M.D., F.R.C.P.
(*representing the Ministry of Health*).

Sir Arthur Horn, C.M.G., M.D., M.R.C.P., D.T.M.

Professor Sir John Ledingham, C.M.G., LL.D., D.Sc., M.B., F.R.C.P., F.R.S.
(*representing the Royal Society*).

G. Carmichael Low, M.D., F.R.C.P.

Sir Philip Manson-Bahr, C.M.G., *D.S.O.*, M.D., F.R.C.P., D.T.M. & H.

Major-General Sir Ernest W. C. Bradfield, K.C.I.E., I.M.S. (retd.).

Sir Edward Mellanby, K.C.B., M.D., F.R.C.P., F.R.S., K.H.P.
(*representing the Medical Research Council*).

Lt.-Col. G. S. Parkinson, *D.S.O.*, M.R.C.S., L.R.C.P., D.P.H., R.A.M.C. (retd.)

The Honourable E. Baring
(*representing the Foreign Office*).

J. B. Sidebotham.
(*of the Colonial Office*).

STAFF OF THE BUREAU:

Director:
Sir H. Harold Scott, K.C.M.G., M.D., F.R.C.P., D.P.H., D.T.M. & H.

Assistant Director:
Charles Wilcocks, M.D., D.T.M. & H.

Secretary:
R. L. Sheppard.

SECTIONAL EDITORS, TROPICAL DISEASES BULLETIN.

Professor P. A. Buxton, M.A., M.R.C.S., L.R.C.P., D.T.M. & H.
Lt.-Col. E. D. W. Greig, C.I.E., D.Sc., M.D., F.R.C.P.E., I.M.S. (retd.).
Maj.-Gen. D. Harvey, C.B., C.M.G., C.B.E., M.D., R.A.M.C. (retd.).
Lt.-Col. W. F. Harvey, C.I.E., M.B., F.R.C.P.E., D.P.H., I.M.S. (retd.).
Professor Edward Hindle, M.A., Sc.D., Ph.D.
Lt.-Col. H. Kirkpatrick, M.B., B.Ch., I.M.S. (retd.).
Lt.-Col. Clayton Lane, M.D., I.M.S. (retd.).
Lt.-Col. A. G. McKendrick, D.Sc., M.B., Ch.B., F.R.C.P.E., I.M.S. (retd.).
Maj.-Gen. Sir John W. D. Megaw, K.C.I.E., D.Sc., M.B., B.Ch., I.M.S. (retd.)
Maj.-Gen. Sir Leonard Rogers, K.C.S.I., C.I.E., M.D., F.R.S., I.M.S. (retd.).
Hugh Stannus Stannus, Ph.D., M.D., F.R.C.P., D.T.M. & H.
M. Sydney Thomson, M.A., M.D., F.R.C.P.
C. M. Wenyon, C.M.G., C.B.E., M.B., B.S., B.Sc., F.R.S.
F. Norman White, C.I.E., M.D., D.P.H., I.M.S. (retd.).
Professor Warrington Yorke, M.D., F.R.C.P., F.R.S.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 39.] 1942. [No. 1.

SUMMARY OF RECENT ABSTRACTS.*

I. CHOLERA.

Epidemiology.

In the epidemiology of cholera emphasis is laid on the existence of endemic foci in inter-epidemic periods, and on the association of outbreaks with high humidity and rainfall.

In the Annual Report for 1940 of the Eastern Bureau of the League of Nations Health Organisation (p. 578) it is pointed out that endemic foci of cholera are established in China as well as in British India. These centres are in the Yuan River valley of Hunan, in the upper reaches of the Yangtse basin and in the hinterland of certain Chinese ports. Infection is principally water-borne, especially in river water, but in some places wells play a part, while infection may be conveyed by flies or by eating foods washed with contaminated water.

In the same publication it is reported that since 1910 the mortality in British India has tended to decline. There is a tendency for cholera to persist in endemic form after epidemics. It is noted that eight cases of El Tor vibrio infection in Celebes occurred in 1940, and that five of these were fatal. In sea and air ports the association of high relative humidity with high temperature, accompanied by intermittent rains, represents the most favourable conditions for the development of the disease in epidemic form. On this basis forecasts of epidemics may be made.

In Bengal, CHATTERJI (p. 210) reports that there was an epidemic of cholera during 1938, in spite of the extensive anti-cholera measures which had been taken. This was attributed to the unforeseen occurrence of floods. From the Central Provinces and Berar, MAKAND (p. 579) reports that in 1939 the largest number of deaths occurred during the period August to October. Rainfall was most heavy in the period June to September, with the peak in July and August.

VENKATARAMAN (p. 212) remarks that in the Tanjore district of the Madras Presidency, the Ogawa type of *V. cholerae* was isolated during the epidemic periods of 1936, 1937 and 1939, but that during 1938, a year of low incidence, the Inaba type was found.

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1941, Vol. 38. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

Aetiology.

LINTON (p. 580) discusses the chemistry and serology of vibrios. The true cholera vibrio is, by common consent, that which (1) ferments mannose and sucrose but not arabinose, (2) does not haemolyse goat erythrocytes, and (3) agglutinates with O-group I serum. But the haemolytic *V. celebes* causes a disease very like true cholera, and it is not yet known if a non-haemolytic vibrio can become haemolytic. The author finds it difficult to insist that the cause of cholera is a distinct entity utterly unrelated to other vibrios, and quotes DE MOOR who considers cholera to be similar to bacillary dysentery in that it may be caused by bacteriologically different organisms. It is evident that further work is called for.

FOURNIER (p. 212) has studied 1,130 strains of *V. cholerae* isolated in Shanghai under epidemic conditions. The strains all possessed certain definite characters on isolation, and belonged mainly to the intermediate Hikojima type. These characters have remained constant in epidemics, at least since 1921, and point to the endemicity of the disease in the Shanghai region. All the agglutinable vibrios belonged to Group 1 of Heiberg ; the Voges-Proskauer reaction was consistently negative. Some of the agglutinable vibrios possessed slight haemolytic power on isolation, but this power appears to be lost after a few months of subculture. Even in non-haemolytic strains, however, there is a phase, between the 6th and 12th hour of cultivation, when haemolysis may be observed. It appears that the cholera vibrio produces both a haemolysin and a neutralizing substance, the latter appearing in culture rather later than the former.

By subjecting typical cholera vibrios to the action of different combinations of choleraphage types VARDON (p. 213) has succeeded in obtaining a number of variants. He concludes from his experiments that the change from the agglutinable to the non-agglutinable state, which TOMB and MAITRA claim to take place in cholera vibrios in tank waters [but which AHUJA failed to confirm, see this *Bulletin*, 1939, Vol. 36, p. 897], is due to the presence of choleraphage, and that phage-infected water vibrios, though avirulent, may revert to the virulent parent cholera vibrios if they are able to rid themselves of the choleraphage infection.

VENKATARAMAN (p. 212) found that agglutinable vibrios remained viable for at least 74 days in water with a salt concentration of 2 per cent. ; in 3 per cent. solution they could not be recovered after 32 days. [See also GENEVRAY and BRUNEAU, this *Bulletin*, 1939, Vol. 36, p. 1. The total salinity of ocean water is from 3·3 to 3·7 per cent.]

VENKATARAMAN (p. 212) states that in the examination of water supplies by means of the mannose-bismuth-sulphite method of enrichment, non-agglutinating mannose-fermenting vibrios could be obtained from practically every tank and river water examined, and that this method of enrichment is therefore not capable of yielding a differential isolation of *V. cholerae* under those circumstances. WILSON and REILLY (p. 211) publish the details of modifications of the fluid and solid media originally introduced by Wilson and Blair for the differential isolation of *V. cholerae*. For the details the original abstract should be consulted.

HUANG *et al.* (p. 579) conclude from their investigations that the failure of bacteria to grow on used agar media, which have been sterilized, is due to inhibiting substances left over from previous cultivation.

Under present circumstances it is not easy to obtain supplies of agar, and the authors have devised a method of washing used and sterilized agar so that, with the addition of some fresh agar, satisfactory media may be prepared from it. Such media have been used repeatedly for the growth of *V. cholerae*.

Basu *et al.* (p. 581) have studied the properties of a diffusate obtained by immersing a cellophane bag, containing sterile salt solution, in a growing culture of *V. cholerae* for five days. This diffusate, which did not contain any histamine-like substance, caused restlessness, cramps, paresis and signs of imminent death in rats, but these passed off in 24 hours. The diffusate contains carbohydrate but practically no protein, gives rise to antibody formation and protects against *V. cholerae*.

White (p. 214) has devised a method by which a suspension of the flagella of *V. cholerae* may be obtained.

From an investigation of the antigens of *V. cholerae*, White (p. 214) concludes that the major component in the somatic agglutination of R and ρ vibrios is a heat stable antigen which, though probably containing some protein, also includes a polysaccharide haptene. He (p. 214) has extracted a heat-stable somatic protein antigen from *V. cholerae*. He gives a list of the various fractions which have now been separated from the bodies of the vibrios and states that antibodies to all these components may occur in the sera of rabbits immunized with living cultures of *V. cholerae*.

Pathology.

Földes (p. 583) describes a method, based on the original Hammerschlag chloroform-benzene mixture, of determining the specific gravity of blood and body fluids. The method involves the use of a special glass vessel, which is illustrated.

Pasricha and Malik (p. 583) give an account of the blood in cholera. There is increase in cell volume, in haemoglobin percentage, in urea and non-protein nitrogen, in total plasma proteins, fibrin and globulin, in organic phosphates and in the glucose concentration. There is decrease in the moisture content of blood and plasma, but this is not marked in the acute stage, and in the concentration of sodium chloride, though this is not great. Chatterjee and Sarkar (p. 583) also give the results of blood investigations in cholera. They find an increase of potassium, inorganic phosphates and of urea and non-protein nitrogen, with a decrease of sodium, calcium, chlorides and blood sugar. These authors point out that one of the most important features is acidosis, which, they note, is also found in shock, with its marked decrease in alkali reserve. In shock there are also the same changes in the serum electrolytes and the same hypoglycaemia.

Ghosh and Chakraborty (p. 585) have investigated the chemical constituents of fresh stools in cholera. All are highly alkaline and the authors relate this fact to the known fact that *V. cholera* grows abundantly in highly alkaline medium. Elimination of alkaline base and of chlorides leads to acidosis and disturbs osmotic balance, and it is thought that the latter may have some bearing upon suppression of urine.

Chatterjee (p. 582) describes the pathological changes in the kidney in cholera. These are not inflammatory; most of the congestive change is ascribed to the action of a histamine-like substance [but see Basu *et al.* above], and anuria is thought to be due to low blood

pressure. The author thinks that the morphological changes in the kidney are in some way connected with a hypersensitive state developed in the course of the disease.

Clinical.

For rapid diagnosis, which can be carried through in four to five hours, WAKAMIYA (p. 211) adds faeces to peptone water, on the surface of which *V. cholerae* grows as a film. Transfer of growth from this film is made by platinum loop into serum diluted 1 in 200, which is incubated. The vibrios are easily isolated and agglutination is evident. PASRICHA *et al.* (p. 580) describe a dilution method for the isolation of pathogenic bacteria from faeces. This method, for the details of which the original abstract should be consulted, has given better results than direct plating in the search for *V. cholerae* and *Bact. typhosum.*

MITRA (p. 215) writes that, in treatment, choleraphage is most effective in the early stages of the attack, but that when dehydration has occurred choleraphage treatment must be supplemented by transfusion of saline. He further states that the use of choleraphage invariably cuts short epidemics of cholera provided that immediate steps are taken to administer it to the whole population exposed to infection.

Control.

YING (p. 585) has conducted important investigations on the persistence of *V. cholerae* in the stools of 200 patients. He notes, incidentally, that the average duration of acute symptoms was 4·5 days. It was found that in 98 per cent. the last positive culture was obtained by the second week, but that in a few cases positive cultures were obtained in the third or even the fourth week. It is therefore dangerous to send away active cases as soon as acute symptoms subside ; in the absence of laboratory controls, cholera patients should be isolated for two weeks from the onset, or at least for one week from the beginning of convalescence.

A plan for the prevention and control of epidemics has been evolved by the National Health Administration of China (p. 578). This is applicable to all tropical countries, and consists of (1) a preliminary survey and organization, (2) prevention of epidemics by means of quarantine stations and the institution of sanitary measures, hospitals and personnel, (3) control of epidemics entails the creation of mobile teams, the organization of large-scale anti-cholera inoculations, the safeguarding of water supplies, the control of the sale of food and drink, the supervision of general sanitary measures and the treatment of patients. For the last, hypertonic saline is more satisfactory than normal saline in the early stages, but for severely dehydrated patients normal saline alone should be given at first. BORCAR (p. 211) notes that in a small outbreak of cholera among the fishing folk of a small Portuguese settlement of Gogola, on the Kathiawar peninsula, the control measures taken were rapid isolation and treatment of the sick, immediate evacuation of contacts, vaccination, disinfection and domiciliary inspection. These were carried out with vigour, and the outbreak did not assume serious proportions. In the Central Provinces (p. 579) the principal preventive measures in use are vaccination, disinfection of water supplies and the distribution of Tomb's essential oil mixture.

Among the anti-cholera measures taken in Bengal, CHATTERJI (p. 210) refers to the work done to improve rural water supplies

Charles Wilcocks.

HELMINTHIASIS.

i. RENAULT (Livio) & VERSIANI (Waldemar). Parasitismo humano por helminthos e protozoarios em Bello Horizonte. Dados estatisticos. [**Statistics regarding Helminths and Protozoa found in Man in Bello Horizonte.**]—*Brasil-Medico.* 1940. July 20. Vol. 54. No. 29. pp. 487–492. [11 refs.] English summary.

ii. CANÇADO (J. Romeu). Estudo sobre a frequencia dos parasitas intestinaes humanos. Commentarios a proposito de 1,000 exames de fezes. [**The Incidence of Parasites in the Intestines of Man as displayed by 1,000 Faecal Examinations.**]—*Brasil-Medico.* 1940. Aug. 17. Vol. 54. No. 33. pp. 551–558. [40 refs.]

i. From various sources the Instituto Biologico Ezequiel Dias, Bello Horizonte, has examined 6,000 fresh faeces in the two years, 1937–39, using two smears, one in normal saline and one in Lugol solution, and in addition, when Mansonian schistosomiasis has been suspected, a preparation by the gravity precipitation method of HOFFMAN, PONS & JANER [this *Bulletin*, 1934, Vol. 31, p. 778]. The authors give these tabulated figures for discovered percentages of infection as well as others for age, sex, employment and residence of those examined.

ii. The Laboratoria Carlos Chagas, Bello Horizonte, has examined 1,000 faecal specimens using the same concentration method as modified by MARTINS [this *Bulletin*, 1937, Vol. 34, p. 799] and also that of DE RIVAS [this *Bulletin*, 1928, Vol. 25, p. 447] and has obtained the tabulated results :—

	i. Instituto Biologico Ezequiel Dias, Bello Horizonte. % positive.	ii. Laboratoria Carlos Chagas, Bello Horizonte. % positive.
Ascaris lumbricoides	19·80	19·2
Strongyloides stercoralis	17·26	8·2
Necator americanus	16·99	15·2
Trichuris trichiura	12·96	22·1
Schistosoma mansoni	10·88	2·3
Taenia sp.	0·75	0·8
Enterobius vermicularis	0·43	2·8
Hymenolepis nana	0·08	0
H. diminuta	0·01	0
Entamoeba coli	16·43	23·8
Giardia intestinalis	9·40	10·8
Entamoeba histolytica	8·33	12·5
Endolimax nana	6·08	1·5
Chilomastix mesnili	2·31	8·1
Iodamoeba bütschlii	2·20	—
Trichomonas hominis	2·06	1·4
Balantidium coli	0·15	0·2
Enteromonas hominis(?)	0·08	—
Embadomonas intestinalis ...	0·01	—
Blastocystis hominis	—	33·0

Clayton Lane.

MUTO (Sangoro). **On the Results of a Faecal Examination of Patients in Muto Children's Hospital during the Last 2 Years.**—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1941. Mar. Vol. 40. No. 3. [In Japanese pp. 490–499. [15 refs.] English summary p. 500.]

MANSON-BAHR (P. H.). **Modern Therapeutics. XXII. The Modern Treatment of Intestinal Parasites.**—*Practitioner.* 1941. Apr. Vol. 146. No. 4 (874). pp. 271–278.

A valuable survey of anthelmintic drugs that have been given for the various helminths, with advice as to lines of treatment. Among the drugs which are stressed is phenothiazine for thread worms, children from 5 to 10 years old getting 15 grains daily for at least 10 consecutive days ; for children under five this dose is halved.

C. L.

DEEDS (Floyd) & THOMAS (John O.). **Studies on Phenothiazine. IX. The Biliary Excretion and Anthelmintic Action of Thionol.**—*Jl. Parasitology.* 1941. Apr. Vol. 27. No. 2. pp. 143–151.

" The evidence presented is, at least, highly suggestive that the anthelmintic action of phenothiazine is due to the thionol excreted into the intestine by way of the biliary tract and that bile facilitates this action."

On oxidation phenothiazine becomes first leucothionol and then thionol, and when the first is given by mouth all three substances are found in the faeces ; but equally all three are found in the bile got by puncturing the gall bladder of rabbits and dogs killed six hours after they have been given phenothiazine by mouth. It is then an open question whether these chemical substances found in the intestine have been formed there and not absorbed, or whether after absorption of phenothiazine they have been formed and excreted through the bile. Further, the good fortune of discovery of a man with a biliary fistula enabled it to be established that the same absorption and the same excretion by the liver occurred when he was being treated by phenothiazine for infection of the urinary tract. Bile secured before the drug was given was free of the drug and its two oxidation products, and that got after its administration contained all three substances.

Controlled experiments showed that phenothiazine had no demonstrable action *in vitro* on *Ascaris lumbricoides* from the pig, that thionol first stimulated and then depressed the worm, the latter action persisting as long as thionol was in adequate concentration, and that bile added to the depressing action.

[If then thionol is the active anthelmintic agent, and since all persons may not be equally good at bringing it into being, the giving of thionol, with or without bile, may well be the next step in this line of treatment.]

C. L.

ERRINGTON (B. J.). **Phenothiazine as an Equine Anthelmintic.**—*Vet. Med.* 1941. Vol. 36. pp. 188–193. [Summary taken from *Vet. Bull.* 1941. Oct. Vol. 11. No. 10. pp. 719–720. Signed H. E. HARBOUR.]

E. discusses a number of cases in which toxic symptoms occurred following administration of phenothiazine to horses, and advocates caution in dosing with this highly efficient anthelmintic. Manifestations were of anaemia, albuminuria, and haemoglobinuria ; four cases

of nephritis are mentioned, although it was not certain that these were directly due to the drug's action. Red blood cell counts showed a decrease of at least a million per cu. mm. in 28 out of 39 animals examined; in a few of these cases the degree of anaemia was severe. Haemoglobinuria was not seen in mature animals following single 30 g. doses. Albuminuria was most often produced in animals which had been previously dosed. One instance is cited which tended to show that some samples of the commercial product might be more toxic than others.

E. advises the use of 30 g. doses for animals the size of mature thoroughbreds; for immature horses of this type a dose of 15 g. is suggested as adequate. Dosage should never exceed 50 g. in any horse. There appeared to be no reason for fasting before administration (many of the animals showing haemoglobinuria had been fasted prior to dosing). Animals showing a tendency to constipation might be given laxative feeds before dosing; the use of mineral oil at the time of dosing was of questionable value. Division of the dose over two successive days gave efficient results but did not appear to affect absorption. The question as to how soon a dose could be repeated remained to be settled. Age and pregnancy were factors which had to be considered in dosing.

SANDGROUND (J. H.). **Coma following Medication with Tetrachlorethylene.**—*Jl. Amer. Med. Assoc.* 1941. Aug. 9. Vol. 117. No. 6. pp. 440–441.

Sandground adds two cases to the record of coma following administration of tetrachlorethylene.

He refers to KENDRICK'S case in the Madras Penitentiary which MAPLESTONE and MUKERJI regarded as unique and of no real importance as an argument against the drug's safety. He notes that these writers doubtless overlooked an administration by WRIGHT, BOZICEVICH & GORDON [this *Bulletin*, 1938, Vol. 35, p. 381] in which a boy of 11 received a dose of 1·1 cc. in 30 cc. of a saturated solution of magnesium sulphate to which had been added 60 cc. of water; he became cyanotic in 1½ hours and in the next half-hour became unconscious four times.

He himself had taken the drug four times in doses of 4 to 5 cc. with drowsiness and a light sleep if he let himself go, such apparently being its normal action; and he describes two cases with deep coma. One was a young Javanese schizophrenic man in an advanced catatonic state who received 4·5 cc. of the drug and became comatose, with all peripheral reflexes abolished. An intravenous injection of Metrazol gave no immediate result, but he came out of coma two hours later and had no other symptoms. The drug was pure and it was thought that such anaesthesia might be disregarded in future work, Javanese later being given doses of 2 to 3 cc. without ill effect; in the Celebes Islands the doses used were 1 to 4 cc. in patients between 6 and 60 years old.

"Not one of the recipients was sufficiently affected by tetrachlorethylene to discourage other members of the patient's family from requesting the medicine.

"It was consequently a matter of great surprise and not a little consternation when, after an uneventful taking of 5 cc. of tetrachlorethylene by

me to eliminate an experimentally induced infestation with flukes, a second member of the expedition fell into deep coma after taking a much smaller dose of the same drug a few days later.

"Case 2. A healthy, well developed man, with nothing in his past history or present condition which would lead one to anticipate that the drug would not be well borne, was given a smaller quantity of the drug solely to determine its vermifugal efficacy on a quantitative basis. Three cc. of well emulsified tetrachlorethylene was taken with a quantity of water into an empty stomach.

"While awaiting the lapse of half an hour before taking a saline purgative, he proceeded to make himself comfortable in an armchair and commenced to read. Ten minutes later he was seen to be breathing deeply as though in profound sleep. Attempts to awaken him were futile. The muscles were completely relaxed, most of the reflexes had disappeared, the pupils were somewhat constricted and the pulse remained full, strong and regular. This condition persisted for nearly two hours, at which time an intravenous injection of metrazol was given. To this injection there was immediate response, but although the subject regained partial consciousness it was several hours before the stupor had worn off completely. He recalled nothing after taking the drug, expressed his satisfaction at having had a restful sleep and proceeded to assist in washing the stools that he passed for the worms contained therein.

Comment.

"Both of these cases presented what appeared to be the action of a general anesthetic akin to ethylene or chloroform. They obviously indicate the need for hospitalizing or otherwise keeping under close surveillance all patients who are treated with tetrachlorethylene even in doses smaller than are usual. While for want of a better drug they should not discourage the use of tetrachlorethylene, they illustrate the truth of a remark which the late Dr. Maurice Hall made to me, to the effect that one cannot assume that any anthelmintic is entirely safe for human use until there are reliable reports on at least a million treatments without any untoward effects."

C. L.

Parpacén (J. Valencia). La estadistica en la clinica de la Schistosomiasis mansoni digestiva. [**Statistics of** *S. mansoni* **Infection of the Bowel.**] —*Gac. Med. de Caracas.* 1941. Jan. 31 & Feb. 15. Vol. 48. Nos. 2 & 3. pp. 191–194 ; 196–200.

Brumpt (E.). Observations biologiques diverses concernant *Planorbis* (*Australorbis*) *glabratus*, hôte intermédiaire de *Schistosoma mansoni*. [**Biology of** *P. glabratus*.]—*Ann. Parasit. Humaine et Comparée.* 1941. Vol. 18. No. 1–2–3. pp. 9–45. With 7 figs. & 1 plate. [57 refs.]

Mansonian schistosomiasis may be prevented—(1) by stopping promiscuous defaecation which may infect snails, a measure that has proved impracticable, (2) by treatment of infected men, disappointing in practice, (3) by getting rid of the snail intermediary. To do the last satisfactorily in Venezuela the biology of *P.* (*A.*) *glabratus* must be known, and the paper records observations on this point.

This snail is widespread in South America. If the vegetation to which it is attached is agitated it rapidly floats and its presence in any stretch of water is disclosed, experiment in a tub showing that 70 per cent. of the snails float in this way. The addition of one part of sea water to three parts of fresh is fatal to this Planorbis even if the

addition is slowly made ; but in the weaker mixture of one of sea water to four of fresh water they can live for 35 days though they neither feed nor oviposit ; yet if taken from the stronger solution when seemingly at the point of death they appear to become normal in about a fortnight. At 25°C. hatching takes place about 10 days or a little later after oviposition, the young live first on microscopic fauna and flora and then collect on any lettuce leaves placed at their disposal. Development is quicker in ample water ; thus when kept singly in 80 cc. of water they began to oviposit on the forty-sixth day, when 274 were put in three litres of water (11 cc. per head) development was much slowed ; the surface area is held to be of little importance here. At 25°C. they produce six generations yearly and this is their probable rate of reproduction in tropical countries.

Probably not more than 20,000 to 25,000 of the local inhabitants of Venezuela are infected, though the local percentage of infection of *P. glabratus* in nature may be as high as 100. Brumpt corrects his statement [this *Bulletin,* 1941, Vol. 38, p. 41] that the tentacular lesions there pictured had not been reported before ; they were described by GORDON, DAVEY and PEASTON for *S. mansoni* in *Planorbis pfeifferi* in Sierra Leone [this *Bulletin,* 1935, Vol. 32, p. 237].

These considerations applied to prophylaxis lead to the following advice. Useless collections of water should be pumped empty. Irrigation and drainage canals should be regularized or, better still, replaced by cement drains. Satisfactory collections of snails by hand will be hard to effect. Seawater in a strength of 35 to 40 per cent., maintained for several days, destroys the snails. If need for economy allows, sulphate or carbonate of copper, quicklime or sulphate of ammonia may be used for this purpose. The planting beside open water of acclimatized *Balanites aegyptiaca* merits trial. Animal enemies of the snail are considered including the small Helobdella leaches which, though rarely, are found in collected snails ; similarly, certain water insects attack this Planorbis but are too rare in nature to be effective in destruction and probably cannot be increased in numbers ; nor is there any parasite known to castrate Planorbis as does a parasite of the duck so destroy Bithynia, which is the intermediate host of *Clonorchis sinensis.* *C. L.*

MEIRA (João Alves). Considerações sôbre os aspectos retosigmoidoscópicos e os quadros radiológicos do grosso intestino na esquistosomiase mansoni. (Doença de Manson-Pirajá da Silva.) [**Rectosigmoidoscopy and Radiology of the Large Intestine in Mansonian Schistosomiasis.**]—*Ann. Paulist. Med. e. Cirurg.* 1941. Apr. & May. Vol. 41. Nos. 4 & 5. pp. 317–24, 327–30, 333–4, 337–44 ; 389–90, 393–4, 397–412, 415–26. [31 refs.] With 19 figs. English summary.

Of the 36 cases dealt with, both methods of examination were carried out in 19.

To the sigmoidoscope, conditions were normal throughout the visible parts in 4, in 3 there was catarrh of the rectum extending to the sigmoid, in 9 there were granulations and hypertrophy, and in 2 there was ulceration ; in 1 the proctitis was atrophic, in 2 erosive, and in 2 there was diffuse congestion ; condylomata, prolapse and fistula were each present in 1; and in 2 piles.

The X-rays showed normal condition in 3 ; insufficiency of the ileo-caecal valve in 11 ; signs of colitis through the whole length in 5, in the ascending, transverse and descending colon in 2, 5 and 7 ; and in the sigmoid in 1—with overlapping ; in one a tumour pressed on the caecum ; in none were polypi seen.

No lesion was diagnostically specific. In all the diagnosis was established by microscopic examination of the faeces, a procedure that should on no account be omitted. *C. L.*

CALDAS (José Mario). Schistosomose em proctologia. [**Schistosomiasis of the Rectum.**]—*Brasil-Medico.* 1940. Aug. 10. Vol. 54. No. 32. pp. 553–536. With 2 figs.

A pedunculated tumour with a wide base sprang from the anterior wall of the rectum 3 cm. from the anus ; it had mainly a smooth surface but at one spot an ulceration covered with bloody pus.

After its removal sectioning disclosed no evidence of malignancy ; but there were in it granulomata made up of lymphocytes, plasma cells, epithelioid cells and eosinophils and having in their central part foreign-body giant cell surrounding a structure with the character of a schistosome egg. There is no mention of examination of the faeces, before or after operation, for these eggs, but Caldas urges his fellows to do so in suspicious cases in the Federal district. *C. L.*

MAGALHÃES (Aggeu) & COELHO (Barros). **Cancer in Schistosomiasis.**—*Bahia Medica.* Brazil. 1941. Jan. & Feb. Vol. 12. p. 7. [Summarized in *Jl. Amer. Med. Assoc.* 1941. Sept. 20. Vol. 117. No. 12. p. 1049.]

" Aggeu Magalhães and Barros Coelho found among 2,014 necropsies in the Department of Pathologic Anatomy of Recife histories of 8 cases of liver cirrhosis with primary cancer. In 5 of these Schistosoma mansoni was present. The eggs of the parasites were encysted by the connective tissue in the portal spaces and did not come in contact with liver cells or with the tumor cells. The authors believe that the toxins of Schistosoma mansoni and not the parasite exert a cancerogenic effect in persons with predisposition to cancer. The virulence of the toxins depends on the thickness of the connective tissue capsule about the eggs. Primary cancer of the liver combined with cirrhosis and schistosomiasis is due to the toxins of Schistosoma which reach the liver by way of the portal blood. It is not dependent on the cirrhosis. Rectal schistosomiasis combined with rectal cancer is rare. Benign rectal tumors may develop from rectal schistosomiasis because the eggs stimulate an energetic connective tissue reaction causing the eggs to become encysted and the virulence of the toxins of the parasite to be greatly diminished."

GELFAND (Michael). **A Note on the Clinical Features of Bilharzia Salpingitis.**—*South African Med. Jl.* 1941. Feb. 22. Vol. 15. No. 4. pp. 69–70.

A study of two cases in which the uterine adnexa were involved, removed at laparotomy, and bilharzial infection proved by the microscope. The symptoms suggesting diagnosis before operation are considered.

In one woman the right tube was grossly diseased and was removed, the left tube showed a few tubercles on its serous coat, the ovaries and uterus appeared normal, microscopic examination of the right tube showed bilharzial ova ; the faeces were then examined and found to contain ova of *S. mansoni* ; a thorough course of antimony was given and later she became pregnant. In the second woman the right tube had much the appearance of that in the first, while the left looked normal. The common symptoms have been pain in the lower abdomen, tenderness in the iliac fossa, a tender mass in Douglas's pouch, no leucorrhoea, no cervical erosion, and little menstrual disturbance.

C. L.

Cawston (F. Gordon). **The Modern Treatment of Bilharzia Disease.** —*South African Med. Jl.* 1941. Sept. 13. Vol. 15. No. 17. pp. 337–338.

Mozley (Alan). **Malachite in the Control of Bilharzia.** [Memoranda.] —*Brit. Med. Jl.* 1941. Oct. 11. p. 511.

In an investigation into the possibility of the control of bilharzia in S. Rhodesia an essential feature has been the search for a practical means of controlling the intermediate hosts, *Physopsis globosa* and *Biomphalaria pfeifferi*. Copper sulphate is relatively toxic to man and animals ; copper carbonate, less soluble than copper sulphate, but as effective, is less toxic, but expensive. The author has found that malachite (mineralized basic copper carbonate) ground and passed through a 200-mesh sieve is suitable and yields an effective concentration of 0·5 part of copper per million in natural water. It destroys the snails in the laboratory and in the field. The solubility is increased by mixing with fresh brewer's waste or the powdered pods of a common Rhodesian tree, *Swartzia madagascariensis*. Malachite is found in S. Rhodesia and the present cost is less than £1 a ton. *C. W.*

Robertson (R. Cecil). **Schistosomiasis in the Tali-Fu Region of Yunnan Province.**—*Jl. Trop. Med. & Hyg.* 1941. Mar. 15. Vol. 44. No. 6. pp. 35–38. With 2 figs. [17 refs.]

This paper was originally published in the *Chinese Med. Jl.*, 1940. Apr., Vol. 57, No. 4, p. 358, see this *Bulletin*, 1941, Vol. 38, p. 42.

Vitug (Wenceslao), Cruz (Jose R.) & Bautista (Laureano D.). **Schistosomiasis involving the Brain : Two Case Reports.**—*Jl. Philippine Med. Assoc.* 1941. June. Vol. 21. No. 6. pp. 291–298. With 2 figs. on 1 plate.

In Case 1 the condition was verified at autopsy, in Case 2 the diagnosis was a reasonable inference, the symptoms being the same and cure taking place under fouadin treatment. These appear to be the third and fourth instances in which the diagnosis was made in the Philippines.

Case 1. In a man of 20 years of age, convulsive seizures began to come on suddenly, each lasting 5 to 45 seconds with unconsciousness ;

he developed paresis of the left lower and right upper extremities, there was retraction of the head, the mouth was drawn to one side. He died in one of these fits 12 days after they began. Eggs of *Schistosoma japonicum* were present in ulcers of the colon and in its serosa, in the liver, lungs and brain. As to the last they were seen in the thickened pia-arachnoid and in the cortex and white matter below it, while the choroid plexus of the left lateral ventricle had many capillaries plugged with the ova. The other organs were normal to naked eye and microscope.

Case 2. A man of 49 had ailed for a year with numbness and weakness; then, abruptly, tremors, spasmodic contractions and paresis set in in all extremities, breathing became difficult and he could no longer walk. Examination showed a large liver, and hemi-anaesthesia and hemiparesis of the right side. The faeces contained eggs of schistosomes, Ascaris and Trichuris. He had "two courses of Fuadin injection and saturated solution of potassium iodide," galvano-faradic therapy and chenopodium.

"During the first week of his stay in the ward the patient had almost daily attacks of spasms of the muscles of the right side of the face and of the right upper and lower extremities and sometimes athetoid movements of the fingers. Subsequently these involuntary muscle contractions disappeared. Gradually, he regained the strength of his right upper and lower extremities, and the normal sensibility to different stimuli of the right side of his body returned. He was discharged strong and walking after about two months."

C. L.

MILLER (John E.). **Schistosome Dermatitis as a Bathing Place Problem.**—*Amer. Jl. Public Health.* 1941. Apr. Vol. 31. No. 4. pp. 305–309. With 1 fig.

The assistant engineer of the Michigan Department of Health points out that this is not a new thing, having been known as weed itch at least as far back as lumbering days, and is no perquisite of Michigan. But there it is a nuisance that affects many who come to the beaches for summer bathing. The present method of prevention is to load on a boat a barrel containing a mixture of copper sulphate and copper carbonate dissolved in water and led through two hoses, one running out on each side of a boat, with their other ends trailing on the bottom. The fluid is siphoned out at a rate which will let a 60 gallon quantity containing 50 lb. copper sulphate and 25 lb. copper carbonate escape over an area of 25,000 sq. feet of beach with infected snails. Relief from the itch was obtained at every beach so treated. Work is continued particularly with the aim of finding an easier, simpler and cheaper way of killing the snails. *C. L.*

WOOLLEY (E. J. S.). **A Case of Paragonimiasis.**—*Jl. Roy. Nav. Med. Serv.* 1941. July. Vol. 27. No. 3. pp. 297–298.

A man who had served on the China station from 1931 to 1933 had severe haemoptysis in 1935, repeated at intervals since, with small quantities of brown or blood-stained mucoid sputum between. At Haslar it was found that Paragonimus ova were present in the sputum at those times only when there was definite haemoptysis. *C. L.*

Ro (Mantoku) & Yokogawa (Sadamu). **Experimental Treatment of Paragonimiasis. Pathologic-Anatomical Observations of Dogs harbouring Lung Flukes** (*Paragonimus westermanii*) **Experimentally Treated with Prontosil in Combination with Emetine Hydrochloride and, especially, Histo-Pathological Changes in the Foci of Lungs and Changes in the Dying Flukes.**—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1941. Feb. Vol. 40. No. 2. [In Japanese pp. 268–304. [10 refs.] With 24 figs. on 4 plates. English summary pp. 304–307.]

This forms Part III of the paper recorded in this *Bulletin*, 1941, Vol. 38, p. 47, and essentially concerns itself with the changes seen in worms killed by treatment and the tissue reactions in 3 dogs treated with a mixture of prontosil and emetine, 3 others treated with emetine alone being controls.

The disappearance of eggs from the sputum was contemporaneous with the death and rapid disintegration of the flukes in the lungs and congestion, bleeding and infiltration of the cyst wall especially by large mononuclears and polymorphs. In unsuccessful treatment, with emetine alone or with the combined treatment, these changes were absent. The first effects on the flukes were disintegration of ovary, testes and Mehlis' gland, but the vitellaria were over-active, filling the uterus and breaking out into the excretory system and thus killing the worm. The explanation of the plates, in English, is full. *C. L.*

Galliard (H.) & Dang-van-Ngu. L'infestation de l'homme et du chien par *Fasciolopsis buski* au Tonkin. [*F. buskii* **Infection of Man and Dog in Tonking.**]—*Rev. Méd. Française d'Extrême-Orient.* 1941. Jan.–Feb. No. 1–2. pp. 31–37. [13 refs.]

In the last 18 months infection of man with *F. buskii* has been found five times in Tonking. In the stools eggs were found once, and the worms were then recovered from the faeces after chenopodium, yet in none of 10,000 local faecal examinations have these large and conspicuous eggs been reported. On three occasions the fluke has been found at autopsy and on one it escaped on incising the intestine for a gastro-enterostomy. All specimens were mature and it seems that their eggs should be found in the stools. On the other hand, in Cochin China the fluke was found in 1908 and 1910 but not since. It is present in from 6 to 47 per cent. of pigs according to season. Morphology has given no grounds for believing that there is more than one species in these different hosts. In the Delta the differences in distribution between man and pig are attributable to their different feeding habits. *Pontederia* (*Eichhornia*) *crassipes*, the plant on which the metacercariae settle, is given to pigs raw, the much rarer fruit of *Trappa natans* is eaten by man only after cooking.

In the dog it has been found in Tonking once naturally—in the stomach. Experimentally two dogs were given flukes by mouth, 15 to each dog. No flukes were found in the intestine when they were killed 10 and 72 hours later, nor had any eggs appeared in the faeces while the dogs lived. A third dog was given 20 by mouth, 18 hours later one was found 2 cm. below the pylorus and there had been eggs in the faeces. Into a fourth and fifth dog flukes were introduced into the small intestine by laparotomy, five into each dog; into the fourth they were put in 35 cm. below the pylorus, and four days later,

three were alive and lively, sited 10, 30 and 90 cm. from the pylorus, and eggs had been present throughout; in the fifth the bowel was opened 50 cm. above the caecum, and three days later all had disappeared from the intestine and no eggs had meanwhile been seen in the faeces. *C. L.*

Unanue (Emilio) & León (Francisco). Dos casos de *Fasciola hepatico.* [**Two Cases of** *F. hepatica* **Infection.**]—*Rev. Med. Trop. y Parasit.* Habana. 1941. Jan.–Apr. Vol. 7. No. 1 & 2. pp. 3–4. With 2 figs.

Eggs of *F. hepatica* were found in the faeces of two patients. For reasons beyond the authors' control the description of one of them is not given. The other was a woman of 29 with obscure abdominal pains particularly in the right hypochondrium and the iliac fossae (her appendix had already been removed). Red cells numbered 4,450,000, haemoglobin 80, eosinophils 1; eggs were recovered by means of the duodenal sound. Under emetine treatments these eggs appeared to become degenerate, but details of the treatment are not given.

C. L.

Shaw (G. W. B.) & Clyne (A. J.). **A Case of Infection with** *Fasciola hepatica.*—*Jl. Roy. Army Med. Corps.* 1941. Mar. Vol. 76. No. 3. pp. 173–174.

A small painful moveable nodule over the seventh rib in the right anterior axillary line proved to contain a *Fasciola hepatica.*

After living 20 years in Switzerland and 10 in India a woman came to hospital for vague abdominal pain, chiefly right-sided. Within nine months she had been in hospital for bacilluria, appendicectomy and myalgia. This time she had a temperature of 99·4°F. and the nodule was discovered; stool examination disclosed no ova or cysts. The Wassermann reaction was +, the Kahn —. On excision of the nodule the fluke was found in it, surrounded by inflamed subcutaneous tissue, but no track ran to deeper structures. It is given as an interesting feature that there had been migration from the liver through the diaphragm and chest wall to the subcutaneous tissue. [It seems, however, likely that, as is not unusual, the cercaria "strayed" in a non-optimum host and became detained on the spot where it was later found, having never reached the liver.] *C. L.*

Brinckmann (Justus). Cólicos biliares originados por Fasciola hepática.—[**Biliary Colic caused by** *Fasciola hepatica.*]—*Semana Méd.* 1941. Jan. 16. Vol. 48. No. 3. pp. 159–161. With 1 fig.

Bonne (C.). Echinostomiasis aan het Lindoemeer in Centraal-Celebes. [**Echinostoma Infection at Lake Lindoe, Celebes.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. May 27. Vol. 81. No. 21. pp. 1139–1167. With 1 fig. English summary.

"Echinostomiasis at Lake Lindoe in Central Celebes was re-investigated by the author during a short visit in 1940. The results were as follows.

"1. The observations by Bonne and Sandground in 1939 of a special density of infection of the mussel Corbicula linduensis with metacercariae of echinostomes at spots near the human habitations on the shore of the lake could be confirmed. An average infection density

of 74 echinostome-metacercariae per mussel at Antja plage contrasted with a minimum of 0·6 metacercariae per mussel in remote places.

" 2. Parallel to this difference in infection rate of the second intermediate host goes a similar difference of infection density of the first intermediate host Anisus sarasinorum. At Antja plage 20 per cent. of the Anisus harbour rediae and cercariae, in remote places no infection was found in 268 Anisus.

" 3. The infection density of Corb. linduensis can be increased from 0·6 to 18 metacercariae per mussel by contact with Anisus sarasinorum from Antja plage.

" 4. On the Celebes coast lives a freshwater mussel, much resembling Corb. javanica from Java. It has been identified by BEQUAERT as Corb. celebensis v. Mart. With regard to echinostome infections Corb. celebensis behaves like Corb. javanensis, which is only very rarely found infected in nature. At Paloe near the coast no infections at all were found in Corb. celebensis. Exposure of these entirely negative Corb. celebensis to the cercariae of Anisus sarasinorum from Antja plage caused an infection with echinostome metacercariae averaging 5 metacercariae per mussel.

" 5. Simultaneous exposure of Corb. linduensis and celebensis to echinostome cercariae (with fluted tail) of Anisus sarsinorum reveals a distinct preference of these cercariae for Corb. linduensis. In one experiment in which 18 cercariae were brought together with two mussels, a single specimen of each species, 13 cercariae were found back as metacercariae in C. linduensis and only one in C. celebensis.

" 6. Feeding to animals of Lindoe-mussels leads to the development of two species of echinostomes, one species with 37 and one species with 45 oral collar spines. In pigeons and ducks the species with 37 spines develops, in rats and mice both species develop. These experimental infections are very irregular and often transient. They may occasionally die out before the worms become sexually mature and start to produce eggs.

" No definite results were obtained by feeding experimentally infected mussels to laboratory animals.

" 7. One cannot with certainty differentiate metacercariae with 37 from those with 45 spines in routine work.

" 8. The experimentally obtained echinostomes with 37 spines resemble E. lindoensis Sandground and Bonne from man. The species with 45 spines resembles E. murinum Tubangui from the rat. There are differences however between this species and the species from the field rats in Java with 45 spines, which also resembles E. murinum. The spines of the Java species are irregular in size and some of them are very large (28–75 μ), the spines of the Celebes species are more uniform (35–45μ). The eggs of the Celebes species are thicker (about 62μ) than the eggs of the Java species (about 56μ). It is not clear yet whether the Celebes or the Java species must be considered identical with E. murinum.

" 9. Man is more readily infected with E. lindoensis by eating Lindoe-lake mussels than any laboratory animal investigated (rat, mouse, chicken, duck, pigeon, monkey). An ideal adaptation exists between man, mussel and echinostome.

" 10. This difference in behaviour makes identity of E. lindoensis with E. revolutum, a natural parasite of ducks, improbable, notwithstanding their morphological resemblance. A dozen wild ducks from the lake were examined for echinostomes with negative results.

" 11. The two types of echinostome metacercariae with 37 and 45 spines respectively are present in the mussels at all points of the lake-shore investigated, even at the spots with a minimal density of infection.

" 12. The infection of the mussels with metacercariae of E. lindoensis all round the lake can probably be completely explained by the presence of the three human foci of infection, the three Toradja villages on the lake-shore. No reservoir host has been discovered. For the infection with metacercariae with 45 spines some animal host must exist, as this species has not been found in man. Rats were negative but only few specimens were captured and examined.

" 13. Certain species of snails: Viviparus javanicus rudipellis, Bulinus ovalinus, Pila conica and Anisus sarasinorum also harbour echinostome metacercariae. Whether they represent metacercariae of E. lindoensis or the species with 45 spines has not been completely worked out. These snails have no importance for the human infections, because they are not eaten.

" Anisus sarasinorum is the only snail in Lake Lindoe known to send out echinostome cercariae.

" 14. Uninfected Lymnaea rubiginosa and Viviparus javanicus brought from Java became carriers of echinostome metacercariae through contact with Anisus sarasinorum from Antja plage.

" From these experimentally obtained Viviparus metacercariae echinostomes with 37 spines developed in mice, from a heavily infected Lymnaea only a few echinostomes with 45 spines developed in a rat, whereas a human volunteer promptly obtained a solid infection by eating one of these Lymnaea. This was probably a lindoensis infection.

" Apparently Anisus sheds the cercariae of both species. This experiment also proves directly that a human infection can develop from Anisus cercariae through a suitable second intermediate host. This same conclusion was drawn indirectly from the observations regarding the infection densities of Anisus and Corbicula along the shores of lake Lindoe, where the mussel Corbicula acts as second intermediate host."

GALLIARD (H.) & v. NGU (D.). Quelques trématodes parasites des animaux domestiques au Tonkin. [**Trematodes of Domestic Animals in Tonking.**]—*Rev. Méd. Française d'Extrême-Orient.* 1940. Mar. No. 3. pp. 131–134.

MALARIA.

MAPLESTONE (P. A.). **Some Aspects of Two Common Tropical Diseases.** —*Med. Jl. Australia.* 1941. Mar. 29. 28th Year. Vol. 1. No. 13. pp. 377–380.

In this paper the author discusses malaria and its treatment, and amoebic dysentery. No new work is presented but the paper is a good résumé of modern practice. *C. W.*

ARCHETTI (Italo). Presenza di *Plasmodium malariae* nella regione fra Sagan e Omo (A.O.I.). [**Presence of *P. malariae* in the Valleys of the Sagan and Lower Omo (Southern Abyssinia).**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 6. pp. 370–373. With 1 map. [16 refs.] German summary (4 lines).

The observations recorded were made in Gondaraba (515 metres) in the valley of the Sagan River, just north of Lake Stefania, and in Elolo and Nargi (500 metres), close to the northern end of Lake Rudolph. In all three places children, for the most part between 1 and 12 years of age, were examined. In Gondaraba, of 95 children 33 were infected with malaria; of these, two harboured *P. malariae*. One *P. malariae* infection was noted among ten children examined in Elolo. In Nargi 60 children were examined; 18 harboured malaria parasites, of whom 10 had *P. malariae* infections. No local *P. vivax* infections were seen. *A. gambiae* and *A. pharoensis* were found.

Norman White.

VAN ROOYEN (C. A.). **Observation of Malaria Parasites in Fresh Blood Films.** [Memoranda.]—*Brit. Med. Jl.* 1941. July 19. p. 87.

"When fresh blood is sealed beneath a cover-slip changes occur which are not obtainable when blood is smeared directly it is shed." The author describes the appearances seen when after three to five minutes under a cover-slip the blood, containing crescents, was stained. One crescent was partly engulfed by a leucocyte. When a crescent is approached by a leucocyte in living blood it performs gyroscopic movements and the granules of pigment are scattered to the periphery; in a specimen stained after five minutes under a cover-slip a similar object was stained and appeared to be one of these rotating bodies caught at a lucky moment. *C. W.*

FIELD (J. W.). **Further Note on a Method of staining Malarial Parasites in Thick Blood Films.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. July 3. Vol. 35. No. 1. pp. 35–42. With 12 figs. on 3 plates.

In an earlier paper [this *Bulletin*, 1940, Vol. 37, pp. 874–5] the author described a rapid method of staining thick blood films for malarial diagnosis, the stain used being brilliant cresyl blue. Though the method has given fairly satisfactory results further experimentation has given a still better method in which Azure I or methylene azure is employed. The staining is carried out with two solutions, A and B.

"Solution (A)	Methylene blue	0·8 gramme
	Azure I	0·5 "
	Disodium hydrogen phosphate (anhydrous)	5·0 "
	Potassium dihydrogen phosphate (anhydrous)	6·25 "
	Distilled water	500 cc.
"Solution (B)	Eosin	1·0 gramme
	Disodium hydrogen phosphate (anhydrous)	5·0 "
	Potassium dihydrogen phosphate (anhydrous)	6·25 "
	Distilled water	500 cc.

" The phosphate salts are first dissolved, then the stain is added. Solution of the granular Azure I is aided by grinding in a mortar with a small quantity of the phosphate solvent. The solutions of stain should be set aside for 24 hours when, after filtration, they are ready for use. Should a scum later appear on the surface, or dye precipitate on the stained films, subsequent filtration is necessary.

" The same solution may be used continuously for many weeks without apparent deterioration but the eosin solution should be renewed when it becomes greenish from the slight carry-over of the methylene blue.

" The stains are kept in covered jars of such a size that the depth of solution is about 3 inches, the level being maintained by the addition of fresh stain as necessary."

The unfixed thick film, which should not be thicker than 10 to 15 times an ordinary thin film, is dipped for one second in solution A. It is rinsed gently in clean water for a few seconds and then dipped in solution B for 1 second. It is again rinsed in clean water for two to three seconds and then placed vertically to drain and dry. It is then ready for examination. The staining is tri-chromatic with sharp colour contrasts between parasites and the ground of laked red cells on which they lie.

The paper discusses the principles of Romanowsky staining as applied to the method and describes, with the aid of a series of micro-photographs, many of the appearances of cells and parasites stained by it. *C. M. Wenyon.*

Noronha (A. J.). **On the Occurrence of Atypical Gametocytes in the Blood-Smears of a Recently Investigated Case of Malaria.**—*Jl. Trop. Med. & Hyg.* 1941. June 16. Vol. 44. No. 12. pp. 73–76. With 10 figs.

The paper, which is illustrated by a series of microphotographs, describes a case of mixed *Plasmodium falciparum* and *P. malariae* infection, in which the gametocytes of the malignant malarial parasite showed certain peculiarities. No typical crescents were present, but the female forms were straight and shaped like a rice grain, or still more elongated with pointed extremities, while the male forms were of a stumpy oval shape. It is thought that the unusual appearance of the gametocytes may have been the result of the particularly heavy infection, which had caused the death of the patient, or to all the crescents being in an immature condition. *C. M. W.*

Buonomini (Giulio). Anofelismo e bonifiche. Studi sulla fauna anofelica dei Consorzi di Bonifica del basso Volturno (Napoli). [**Anophelism and Bonification. Studies of the Anopheline Fauna in the Region of the Lower Volturno (Naples) undergoing Bonification.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 3. pp. 130–148. With 1 map & 2 graphs. English summary (8 lines).

The observations recorded in this paper were carried out from July 1937 to November 1938 in an area of some 220 square kilometres lying on both sides of the lower reaches of the River Volturno, to the north of Naples. The population of the area is 23,500. Bonification is in progress ; at the time of the investigation this had reached varying stages of development in different parts of the area. Five varieties of *A. maculipennis* were found, *typicus, melanoon, messeae, labranchiae*

and *elutus*. The last two, *labranchiae* and *elutus*, are the most important vectors; their relative prevalence diminishes with the progress of bonification. A study of endemic malaria was made in Castelvolturno, situated on the left bank of the mouth of the river. Here the maximum incidence of malaria occurred a month later than the maximum prevalence of anophelines. Anophelines were not very numerous but *A. m. labranchiae* and *elutus* constituted 73 per cent. of Anopheles with mature ova caught in human habitations. Man was found to have very little attraction for *A. m. messeae* and *melanoon*. *A. m. typicus* was commonly found in human dwellings. *N. W.*

DE JESUS (P. I.). **Physicochemical Factors affecting the Breeding of *Anopheles minimus* var. *flavirostris*.**—*Acta Med. Philippina.* 1941. Jan.–Mar. Vol. 2. No. 3. pp. 333–340. [18 refs.]

The author has made observations on the distribution of larvae of *A. minimus* var. *flavirostris* in waters in Laguna Province, Philippine Islands. He studied a length of stream, and a group of wells: in parts of the stream and some of the wells the insect was consistently present, in others absent.

As the result of a large number of analyses for 11 chemical factors it is concluded that (in this area) the larvae were found where carbon dioxide and nitrate were low and oxygen high. This was true of both types of environment, the difference in oxygen tension being particularly well marked in the wells, as the following figures (in parts p.m.) show:—

	Stream	Wells
Positive for *minimus*	5·78	2·93
Negative „ „	4·37	1·02
Difference	1·41 ± 0·198	1·91 ± 0·185

The author concludes that "oxygen was a very significant factor affecting the breeding of *A. minimus*" [but this does not necessarily follow from his observations, for it may well be that a high oxygen value is associated with some other factor which is the effective one.]

P. A. Buxton.

BIANCHI (Carlo). Contributo allo studio delle sindromi anemiche postmalariche. [**Contribution to the Study of the Post-Malaria Anaemia Syndrome.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. Nos. 4, 5 & 6. pp. 234–250; 318–335; 374–386. With 15 figs. [58 refs.]

This is a long and detailed account of a painstaking investigation of malarial anaemia, carried out in Sassari, Sardinia, where the author had an abundance of clinical material. The results of the study of 45 patients are given. Twelve of these were sufferers from acute malaria, all of whom harboured malaria parasites in the peripheral blood or in the bone marrow or in both. In a second group were 16 patients who suffered either from chronic malaria or from a primary infection but in whom there had been freedom from acute febrile manifestations of the disease for some little time. A third group comprised 17 sufferers from chronic malaria who had not for a long time suffered any acute febrile attacks. A haemometric study was made of each patient, and a sternal puncture was made in each case.

Some patients were also submitted to hepatic puncture. The findings of all cases are tabulated and numerous microphotographs amplify the text. The author summarizes his findings as follows :—

" Post-malarial anaemia is the expression of pathological changes in the bone-marrow, directly attributable to the infection. These changes provoke a macro-megalocytic anaemia, with a marked degree of reticulocytosis and neutropenia. There are peripheral signs of reticulo-endothelial stimulation. Anatomo-pathologically it is characterized by an erythroblastic hyperplasia with frequent evidence of abnormal cell development and the presence of atypical forms (megaloblasts with mis-shapen nuclei and of abnormal size, signs that the erythroblasts are derived from histiocytes).

" The fundamental erythroblastic hyperplasia is constantly associated with a hypoplasia of the haematoblasts (cellule staminali), a hyperplasia of the cells of the reticulo-endothelial system, a hypoplasia of granulocytes, and an abundance of plasma-cells and lymphocytes.

" Discussing opinions formerly held with regard to the significance of the marked changes constantly seen in the bone-marrow of acute and chronic malaria cases, the author considers the involvement of the bone-marrow to be the predominant pathogenic factor in the production of the anaemia. Other factors, such as a humoral-splenic inhibition of medullary function, haemolysis, constitution, possible food deficiency, etc., are of but secondary importance as pathological factors. There is a pathogenic affinity between post-malarial anaemia and the anaemias of cytogenic dysfunction."

N. W.

Hoch (Paul), Kusch (Ernest) & Coggeshall (L. T.). **The Treatment of General Paresis with Malaria induced by injecting a Standard Small Number of Parasites.**—*Amer. Jl. Psychiatry.* 1940. Sept. Vol. 97. No. 2. pp. 297–307.

The induction of malaria by direct inoculation of infected blood is simpler than the natural method of infection, but infections so induced are extremely varied : sometimes early severity necessitates interruption ; sometimes spontaneous recovery occurs before the patient has derived appreciable therapeutic benefit. Such considerations prompted an inquiry into how far the variable number of parasites in the inoculum is responsible for the variable results. Thirty-two patients were inoculated with a calculated small number of parasitized red-cells ; none received more than 1,000 trophozoites. The McCoy strain of *P. vivax* was used throughout.

A thin blood-smear from the donor patient was made. If parasites were present as young ring forms parasite and red cell counts were made. One cc. of infected blood was then drawn and mixed with heparin granules. This sample was diluted with citrated normal blood so that 1 cc. of the mixture contained a million parasites. Further dilutions were then made so that 1 cc. contained 1,000, 500, 250 or 100 parasites as required. All inoculations were given intravenously. Some patients received a calculated dose of one parasite.

There was a relationship between the dose and the incubation period but the character of the infection, once established, was independent of the infecting dose. Small standardized doses of parasites gave more uniform results than the artificial methods generally used ; subsequent infections seemed to be better tolerated by the patients and usually better therapeutic results were obtained. An extremely small number of trophozoites of the strain used, between 100 and 250, is sufficient to induce infection. *N. W.*

Mollaret (P.). Le problème de l'absence de toute période d'incubation dans l'impaludation artificielle par injection directe de sang. [**The Problem of the Total Absence of an Incubation Period of Malaria transmitted by the Inoculation of Blood.**]—*Bull. Soc. Path. Exot.* 1940. Vol. 34. Nos. 1–3. pp. 62–80. With 7 figs. [25 refs.]

In the author's malaria therapy practice infection is transmitted by infected blood taken from the donor and injected immediately into a number of patients awaiting treatment. No anticoagulant is required and the syringe is of sufficient capacity for the series of patients who have been previously prepared. The usual dose of infected blood is 5 cc.; it is generally given intramuscularly, occasionally intravenously.

During an experience of more than ten years with the same strain of *P. vivax* occasional cases have been observed in which no incubation period preceded the onset of malarial paroxysms: such cases have been extremely rare. The two cases now reported present unusual and interesting features.

Two men each received 5 cc. of infected blood from the same syringeful, one intramuscularly, the other intravenously. The day following the inoculations was uneventful; on the third day both patients simultaneously suffered from typical malaria paroxysms, at the same time as the donor was suffering from his tenth, and last, paroxysm. The temperature curves of the three men, donor and recipients, for this day can be almost superimposed. The recipient who was inoculated intramuscularly had never had malaria; the other had been subjected to a course of malaria therapy two years previously. Blood from these anomalous cases inoculated into other patients produced infections after normal incubation periods, as did the blood of the original donor taken the day after the withdrawal of blood which produced the anomalous attacks.

The author discusses at length similar cases that have been reported in the literature, and the possible causes of an unusual phenomenon.

N. W.

War Office. **Notes on the Treatment of Malaria occurring in Individuals returning from Service in Malarious Areas.**—6 pp. 1941. June 30. London: H.M.S.O. [1d.]

In the introduction it is pointed out that cases of malaria may be expected in men who return to Britain from service overseas in malarious countries, and that a high proportion of those seen have been suffering from the dangerous malignant tertian variety. The standard Army treatment is as follows:—

"Days 1 and 2:—
Quinine bisulphate *or* Quinine hydrochloride, grains 10, in solution, in one fluid ounce of water, by mouth, three times in 24 hours.

"Days 3, 4, 5, 6 and 7:—
Mepacrine hydrochloride, 0·1 gramme tablet, three times a day, swallowed whole with a draught of water, after food.

"Days 8 and 9:—
No anti-malarial drug treatment.

"Days 10, 11, 12, 13 and 14 :—
Pamaquin, 0·01 gramme tablet, three times a day, after food.

Note.—Quinine dihydrochloride (acid hydrochloride of quinine), or Quinine sulphate, in dosage of 10 grains, may be used in place of the salts mentioned above, but the dihydrochloride is more unpleasant to taste and the sulphate requires the addition of one minim of Dilute Sulphuric Acid (B.P.) or of 3 grains of Citric Acid per grain of the quinine salt in order to effect solution."

[Mepacrine is the British equivalent of atebrin ; Pamaquin that of Plasmoquine.] Short notes are also given on general treatment, special symptoms, intramuscular and intravenous injection of quinine, and courses are suggested in cases where atebrin or quinine is not available. The pamphlet is concise and dogmatic, as it should be.

C. W.

Rogers (Leonard). **The Treatment of Malaria.**—*Practitioner.* 1941. June. Vol. 146. No. 6. pp. 361–364.

Parise (N.). Sull'impiego nella terapia antimalarica di preparati ad azione complessa. [**Treatment of Malaria with Preparations of Complex Activity.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 6. pp. 404–412. With 2 graphs. [36 refs.] French summary (6 lines).

This is a record of the treatment of 38 cases of malaria with a proprietary preparation called Iamar. Its exact composition is not divulged but it is said to contain quinine, arsenic, berberina, methylene blue, eucalyptus, calcium and sodium glycerophosphates, gentian, quassia, etc. It is sold in three forms, pill, solution, and preparation for injection. A course of treatment lasts 25 days. Seventeen patients had *P. falciparum* infections, 22 *P. vivax*. Most of the cases were relapses. The author expresses himself as highly satisfied with the results of treatment. The patients' health and capacity for work were rapidly restored.

N. W.

Sorge (Giuseppe). Otto anni di esperienza su una nuova arma italiana per la lotta antimalarica. [**Eight Years' Experience of a New Italian Weapon in the Anti-Malaria Campaign.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 4. pp. 256–272. [Bibliography.] French summary (7 lines).

Ascoli's method of treating malaria with intravenous injections of adrenalin is the new therapeutic weapon referred to in the title of this paper. The author passes in review a very large number of the successful results achieved by this method of treatment that have been reported in the literature during the past eight years. He concludes that these results fully demonstrate the value of the treatment for all forms, and for all stages, of malaria infections. In discussing the *modus operandi* of the drug he retreads ground that is quite familiar to those conversant with the very extensive literature of this subject.

N. W.

BALLERO (Stefano). Il valore profilattico e terapeutico dell'adrenalina endovenosa nell'infezione malarica. [**Prophylactic and Therapeutic Value of Intravenous Injections of Adrenalin in Malaria Infections.**] —*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 6. pp. 387-394. French summary.

In Sassari, Sardinia, 89 individuals, of a highly malarious community, who were suffering from enlargement of the spleen or other manifestation of malaria, were submitted to Ascoli's treatment during an inter-epidemic season. The adrenalin preparation used was "surrenasi Serono" [see this *Bulletin*, 1941, Vol. 38, p. 107]. A very marked improvement in the health of these patients was noted. There was a marked reduction in the size of the spleen in 74 per cent., and a moderate reduction in 13 per cent. of the cases. During the subsequent malaria season only 4·4 per cent. of the treated suffered from malaria and they had but one attack each. Among the much larger untreated control population, approximately, 500, 47·5 per cent. suffered from malaria (averaging three attacks each or 143·9 per cent. manifestations of malaria). The treatment was well tolerated by all; several pregnant women were included in the treated group.

In addition, during the epidemic season, 42 persons suffering from attacks of malaria were treated in two neighbouring dispensaries by Ascoli's method. In 28 of these, small doses of quinine supplemented the treatment. Good results were obtained, with and without quinine alike. In 87·2 per cent. of these patients there was a very marked reduction in the size of the spleen and a moderate reduction in the remaining 13 per cent. *N. W.*

BALLERO (Stefano). La terapia adrenalinica nella lotta contro la malaria in comprensorio di bonifica: suoi risultati a distanza. [**Adrenalin Therapy in Anti-Malaria Campaign in a "Bonification" Area: Durability of its Results.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 6. pp. 395–403. French summary (8 lines).

Malaria was extremely prevalent in a "bonification" area. Its population in 1936 was 457; in that year 449 malaria attacks were registered of which 94 were primary infections. The spleen index was 74 per cent. The usual antimalarial measures were ineffective. During 1937, 250 persons were submitted to Ascoli's treatment; this number represented 38·4 of the total population, which had increased to 650. Seventy-two chronic afebrile cases were treated in May; 98 febrile cases in July, and 80 chronic cases during the last four months of the year. These persons were kept under observation till the end of 1939; they belonged to the same families as the 400 untreated persons who acted as a control. During the three epidemic seasons, 1937–39, and the two intervening inter-epidemic seasons the total number of malaria cases recorded among the treated was 27. The number of cases among the untreated during the same period was 1,730. These remarkable results testify to the durability of the refractory state conferred by Ascoli's treatment. In 97 per cent. of the persons treated there was a

very marked improvement in general health and in capacity for work. The economic value of the treatment in such conditions as these is stressed at some length. *N. W.*

EJERCITO (Antonio). **" Pampana Siphon " for Automatic Flushing of a Stream as a Naturalistic Method of Malaria Control. (Design I.)**—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 6. pp. 345–369. With 1 sketch map, 6 figs. & 6 photos.

This is a description of a series of three simple automatic siphons, separated by distances of 171 and 49 metres, which successfully controlled anopheline breeding in a small creek. The installation is of a primitive kind. Each siphon consists of inlet and outlet iron pipes connected by elbow joints to a horizontal iron pipe which traverses the top of a dam. The dams were *cutcha*, constructed of earth with bamboo and rusty tin supports. It is the *cutcha* construction which, according to the author, justifies the consideration of this flushing device as a naturalistic method of malaria control—a curious contention. The author has named his contraption the Pampana Siphon as his " humble offering to honor Dr. Emilio J. Pampana, former Secretary of the Malaria Commission of the League of Nations." *N. W.*

KIKUTH (Walter) & MUDROW (Lilly). Malariaprobleme im Lichte neuer parasitologischer Erkenntnisse. [**Malaria Problems in the Light of New Knowledge in Parasitology.**]—*Deut. Med. Woch.* 1941. Jan. 24. Vol. 67. No. 4. pp. 85–89.

The authors trace the development of our knowledge of the exoerythrocytic schizogony of malarial parasites. They show how the study of induced malaria in general paralytics and the failure of quinine to prevent infection resulting from the injection of sporozoites led to the hypothesis, first clearly enunciated by JAMES, that some hitherto unrecognized stage of development, probably in cells other than red blood corpuscles, intervened between the sporozites and the first forms to appear in the red blood corpuscles. Subsequently the discovery of the exoerythrocytic schizogony in various bird malarial parasites in infections produced by mosquito bites afforded the first proof of this supposition. Careful observations on the fate of sporozoites when injected in large numbers showed that each sporozoite at the site of inoculation or in the internal organs entered a cell of the reticulo-endothelial system and developed into schizonts with one to four or more nuclei, the merozoites arising from which would seem to be capable of entering either reticulo-endothelial cells to give rise to exoerythrocytic schizonts or red blood cells to develop into the pigmented blood forms. Observations on the blood or bone marrow of cases of human malaria by various observers had, in the case of the three common forms, revealed pigment-free schizonts which appear to correspond with the more fully studied exoerythrocytic schizonts of bird malaria. This recently acquired knowledge of the development of sporozoites after their injection into the vertebrate host opens new fields of chemotherapeutic research directed towards the discovery of true prophylactics which will destroy the parasites before they have reached the stage of invasion of the red blood corpuscles. *C. M. W.*

i. Schulemann (W.) & Knoche (E.). Zum Problem der exo-erythrocytären Entwicklungsformen von *Plasmodium gallinaceum*. I. [**The Problem of the Origin of the Exoerythrocytic Developmental Forms of *P. gallinaceum*.**]—*Arch. f. Experim. Path. u. Pharm.* 1941. Mar. 31. Vol. 197. No. 3. pp. 227–239. With 3 figs.

ii. Knoche (E.). Zum Problem der exo-erythrocytären Entwicklungsformen von *Plasmodium gallinaceum*. II.—*Ibid.* pp. 240–251. With 7 figs. (5 coloured).

i. In the first of these papers the authors describe experiments on the influence of blockage of the reticulo-endothelial system in *Plasmodium gallinaceum* infection in fowls.

It is well known that an intravenous injection of trypan blue brings about blockage of the reticulo-endothelial system in mammals. If repeated injections are given, not only is there a more intense blockage with particles of the dye but hypertrophy of the reticulo-endothelial system follows. Similar results have been shown to occur when colloidal solutions of palladium are injected. There is one difference, however. Whereas the injection of the more diffusible dye leads to stimulation of the reticulo-endothelial system throughout the body, the injection of the non-diffusible colloidal metal stimulates only the cells which occur in the vascular system. These results were obtained by experiments on mammals but it is shown in this paper that chickens respond in the same way, affording an opportunity of studying the effects of the changes brought about in the reticulo-endothelial system on malarial infections in chickens.

Accordingly chickens which had been infected with *Plasmodium gallinaceum* were given intravenous injections of colloidal palladium at varying stages of the infection. When the injection is made at the height of the infection there is generally a fall in the number of parasites in the blood. If the injection is made earlier, when parasites first appear in the blood, then the resulting infection is less intense than it would otherwise have been. When the palladium injection is made before the infecting dose of malarial parasites is given the incubation period is increased. If at the commencement of the infection a series of palladium injections is begun, not only is the blood infection reduced so that it disappears earlier than it does in untreated chickens, but the number of exoerythrocytic schizonts is very greatly increased also. They appear in every organ of the body, while in the brain they fill the blood vessls so completely that the organ is seriously damaged. Another feature of the infection in the treated chickens is that the anaemia at the height of the infection is less marked. Though in treated chickens the exoerythrocytic schizonts are produced in greater numbers they do not appear any earlier in the infection.

ii. In the second paper an account is given of experiments designed to explain the results described in the first paper. Chickens were similarly infected and treated and were examined post mortem at various stages of the infections. It is noted that not only do the palladium injections bring about hypertrophy of the reticulo-endothelial system but the phagocytic powers of the cells are much increased also. When chickens are infected and not treated with palladium there is some phagocytosis of infected red blood corpuscles. The majority of such phagocyted cells with their included parasites are destroyed, but in a small number of cases the included parasites may survive and give rise to exoerythrocytic schizonts. As regards the unphagocyted infected red

cells the parasites in them continue their development and produce the usual blood infection. In the case of the palladium treated chickens, on account of the increased activity of the reticulo-endothelial system, the infected red cells are subjected to more intense phagocytosis. Larger numbers of phagocyted parasites survive and develop into exoerythrocytic schizonts, which are thus found in greater numbers than in untreated chickens. Furthermore, the increased phagocytosis means that fewer infected red cells remain free to develop in the blood, so that the infection never reaches the intensity that it does in untreated chickens. *C. M. W.*

ZAIN (H.). Zum Ursprung der Endothelstadien des *Plasmodium gallinaceum.* [**On the Origin of the Endothelial Stages of** *P. gallinaceum.*]—*Arch. f. Experim. Path. u. Pharm.* 1941. Feb. 24. Vol. 197. No. 2. pp. 210–223.

——. Zur Entstehung der Endothelformen der Vogelmalaria (*Plasmodium gallinaceum*).—*Klin. Woch.* 1941. Feb. 15. Vol. 20. No. 7. pp. 176–177. [11 refs.]

It is generally recognized that exoerythrocytic schizonts in bird malaria (*Plasmodium gallinaceum*) develop directly from sporozoites, but it is not so clear that they are able to arise from the pigmented erythrocytic forms of the parasites or the products of division of these, the merozoites.

In these two papers, the first being a preliminary note to the second, the author records the results of experiments and observations which were designed to answer this question.

If blood from an infected fowl is taken at the height of the infection and injected intramuscularly to another fowl, parasites first appear in the blood in six to nine days, and the height of the infection is reached on the tenth to the seventeenth day. The parasites in the blood then decrease in number till they disappear at about the twenty-first day. If the brains of fowls are examined for exoerythrocytic schizonts it can be shown that as a rule none is present before the twenty-first day after the inoculation. If infected blood is inoculated intravenously instead of intramuscularly the whole infection is hastened. Parasites appear in the blood almost at once, while exoerythrocytic schizonts are found in the brain at a correspondingly early date. The interval between the first appearance of parasites in the blood and the first occurrence of exoerythrocytic schizonts in the brain is the same in the two cases. Citrated blood taken from fowls at the height of infection was centrifuged and it was found that the supernatant fluid was still infective when injected intramuscularly. If such supernatant fluid is passed through filters with pore measurements up to 2·27μ the filtrate is no longer infective. It seemed evident that the infective agents had been removed by the filter and that these must be some form larger than a merozoite, which has a diameter of about 1μ. Examination of smears of the material held back by the filter showed, amongst other forms, a number of mature pigmented schizonts which had escaped from their erythrocytes and were ready for disruption into merozoites. It is concluded that these schizonts, which fail to be removed from the citrated blood by centrifugation, are responsible for the infectivity of the original supernatant fluid. As the infections caused by injection of supernatant fluid ultimately led to the development of exoerythrocytic schizonts in the brain, it is held that the results obtained

afford proof of the origin of these schizonts from pigmented erythrocytic stages of the parasite. Furthermore, it appears that fowls, inoculated with blood taken from infected fowls when exoerythrocytic schizonts are present in the brain, develop such schizonts earlier than fowls inoculated with blood taken from infected fowls before the schizonts had formed in the brain. The explanation of this is that when exoerythrocytic schizonts are present in the brain they not infrequently occur in the blood also, and when such blood is inoculated to a fowl the schizonts lead to the earlier appearance of the same forms in the brain. When blood which does not contain such forms is inoculated, the resulting infection has to reach its height and subside before the exoerythrocytic schizonts are formed, presumably from ordinary erythrocytic schizonts which have been phagocyted by cells of the reticulo-endothelial system. *C. M. W.*

Vezzoso (Bartolomeo). L'immunità passiva nell'infezione da *Plasmodium gallinaceum*. Nota prima. [**Passive Immunity in** *P. gallinaceum* **Infection.**]—*Riv. di Malariologia.* Sez. I. 1940. Vol. 19. No. 3. pp. 121–129. [18 refs.] English summary (6 lines).

An attempt was made to influence *Plasmodium gallinaceum* infections in fowls by administering the serum of fowls which had recovered from the acute stage of infection with this parasite. In no case, not even when the serum was given during the incubation period, was there evidence that any degree of passive immunity had been conferred by intravenous or intraperitoneal injections of the supposedly immune serum. *C. M. W.*

Africa (Candido M.), Dy (Francisco J.) & Soriano (Lily J.). **Further Studies on the Effect of Prontosil on Avian Malaria.**—*Acta Med. Philippina.* 1940. Oct.–Dec. Vol. 2. No. 2. pp. 239–251. With 2 figs. on 1 plate.

In a previous paper [this *Bulletin*, 1941, Vol. 38, p. 415] the authors showed that prontosil had a decided action in checking malarial infection in birds. In the present paper further experiments are described in which solutions of prontosil were administered daily to Java sparrows (*Padda oryzivora*) infected with *Plasmodium relictum*. The daily dose of 0·066 cc. of 0·5 per cent. solution was injected into the pectoral muscles. It was evident that this treatment cleared the blood of parasites, for these could not be detected by blood examination or injection of blood into uninfected birds, but that parasites had not disappeared entirely from the blood or organs was proved by the fact that relapse invariably occurred. These relapses took place even though the drug was administered for many days after parasites could no longer be detected in the blood. All the birds were treated for 82 days so that each received 5·4 cc. of the 5 per cent. solution. The definite action of the drug in the experiments reported is contrasted with Coggeshall's failure to influence *P. lophurae* and *P. cathemerium* infections in birds with sulphanilamide, and his marked success with *P. knowlesi* in monkeys (1 gramme by the mouth being sufficient to eradicate the infection entirely) and failure with *P. vivax* in man.

C. M. W.

AMOEBIC DYSENTERY AND OTHER INTESTINAL PROTOZOAL INFECTIONS.

SALIS (Herbert). **Studies on the Morphology of the *E. histolytica*-like Amoebae found in Monkeys.**—*Jl. Parasitology.* 1941. Aug. Vol. 27. No. 4. pp. 327–341. With 3 graphs & 19 figs. on 2 plates. [18 refs.]

The careful examination and measurement of the entamoebae in stained films of faecal material from a number of different species of monkey have shown that two organisms of the *E. histolytica* type exist. In the one which gives rise to 4-nucleated cysts containing a small number of bar-like chromatoids and occasionally a glycogen vacuole the resemblance to *E. histolytica* is complete. In the other the mature cyst is uninucleated and contains, typically, numbers of small chromatoids of irregular shape. The nuclei have the same general structure as those of *E. histolytica* but are finer as regards the chromatin granules and the karyosome. Exceptionally cysts with two nuclei occur, but these are regarded as supernucleated cysts, as in the case of cysts of *E. histolytica* and *E. coli* with more than four or eight nuclei respectively. Again, as in the case of other entamoebae, distinct races with different average size of cysts occur.

This uninucleated *E. histolytica*-like entamoeba is identified as *E. chattoni* Swellengrebel, 1914. It is noted that entamoebae of the same type have been described from ox, horse, sheep, goat, gnu and pig. What evidence there is appears to indicate that *E. chattoni* is non-pathogenic. Two plates in black and white illustrate the two types of monkey entamoeba described. *C. M. Wenyon.*

REES (Charles W.), REARDON (Lucy V.), JACOBS (Leon) & JONES (Frances). **Problems Encountered in the Growth of *Endamoeba histolytica* in Cultures Developed by Micro-Isolation.**—*Amer. Jl. Trop. Med.* 1941. July. Vol. 21. No. 4. pp. 567–578. [15 refs.]

As a preliminary to attempts to cultivate *Entamoeba histolytica* in bacteria-free media, cysts obtained by a process of micro-isolation were freed from bacteria and planted on the medium of Boeck and Drbohlav previously inoculated with a pure culture of some bacterium. In this way cultures of *E. histolytica* with pure cultures of a number of different bacteria were obtained. When ten cysts only were planted in the medium previously inoculated with either *Bact. coli* or a certain streptococcus (NIH 563), 20 per cent. of the tubes containing the streptococcus yielded cultures of the entamoeba but none of the tubes containing *Bact. coli*. When 25 cysts which did not stain with neutral red and could therefore be regarded as viable were inoculated to medium containing the streptococcus, as many as 80 per cent. of the tubes yielded cultures of *E. histolytica*. Cysts left standing in normal saline solution and cysts washed with 1/5000 solution of mercuric chloride exhibited a lowered viability. Though cultures of amoebae with pure cultures of bacteria were readily obtained by inoculating media containing them with cysts from cultures or directly from fresh human stools, no growth was obtained when killed bacteria or the

products of their disintegration were present instead of the living bacteria. The addition of other materials was also tried but in no case could a culture be obtained in the absence of living bacteria.

C. M. W.

KARUNARATNE (W. A. E.). **The Pathology of Amoebic Hepatitis including a Consideration of the Pathogenic Role of the** *Entamoeba histolytica*. **Parts I & II.**—*Jl. Ceylon Branch Brit. Med. Assoc.* 1940. Dec. Vol. 37. No. 4. pp. 213–254. With 12 figs. on 3 plates [5 pages of refs.]; 1941. Mar. Vol. 38. No. 1. pp. 1–38. [8 pages of refs.]

This monograph constitutes an extremely good review of the past literature of this subject. Readers are counselled to consult the historical aspects in the original. *P. Manson-Bahr.*

MANSON-BAHR (Philip). **Amoebic Dysentery and its Effective Treatment. A Critical Study of 535 Cases.**—*Brit. Med. Jl.* 1941. Aug. 23. pp. 255-258. With 1 chart. [19 refs.]

This paper embodies a study conducted over a period of 20 years of 535 selected cases of amoebic dysentery in every one of which diagnosis was made certain by the demonstration of active *E. histolytica* or its cysts.

Four hundred and fifty were in males : 85 in females—all Europeans with the exception of 8 in Indian seamen. They hailed from 64 countries. Included was one indigenous case from New South Wales and one from the London docks.

Most cases originated between the ages of 20 and 40 ; there were 8 under 20 ; the youngest being $7\frac{3}{4}$, though the infection had been acquired at 2 years of age. Twenty-six cases were diagnosed by the presence of *E. histolytica* in scrapings from ulcers in the rectum ; 222 by active *E. histolytica* in the faeces, and 287 by cysts or precystic forms.

In no instance were active *E. histolytica* and its cysts found simultaneously in a blood and mucus stool.

Sigmoidoscopy was performed in 258 instances, amoebic ulcers and other characteristic lesions being found in 234 : only in 9·3 per cent. was the mucosa normal. Routine sigmoidoscopy is therefore of great value in diagnosis. From the large series it appears that amoebic dysentery is usually chronic and seldom dangerous to life. Thus there was only one death and the patient was moribund on admission to hospital. The great majority were apyrexial, but fever, usually denoting hepatitis, was recorded in 30 ; there was, however, one case of " amoebic fever " simulating typhoid in intensity and clinical appearances. Diagnosis was rendered certain by sigmoidoscopy : no *E. histolytica* were ever demonstrated in the faeces of this patient. Acute cases with bloody diarrhoea and distressing symptoms were recorded only in 4 ; 244 could be classified as subacute and 287 as chronic ; in 15 the chief complaint was chronic diarrhoea ; 2·8 per cent. were symptomless and classifiable as " cyst carriers ".

The average duration prior to hospitalization was $4\frac{1}{2}$ years ; in 24 the disease had persisted for 16 years ; only 4·7 per cent. were seen in the first attack.

Enlargement of the liver was present in 76. The caecum and transverse colon were thickened in 128, but pericolonic infiltration of the sigmoid colon was present in 212. Loss of weight is exceptional and was recorded in 61. Intermittent haemorrhages, with *E. histolytica* in the blood of the stools, were recorded in 4.

Localized deep abdominal tenderness over the caecum and sigmoid was most frequent (173), tenesmus rather rare (7); meteorism and flatulence as an outstanding feature occurred in 45; vomiting in 3 only. Solitary localized amoebic ulceration of the rectum resembling carcinoma was noted twice; in both cases the condition had taken many years (10 and 21) to develop. Diagnosis was made certain by "scrape" preparations. Rectal prolapse due to amoebiasis occurred in 3; appendicitis (non-amoebic) in 5·4 per cent.

Latency is a curious feature of intestinal amoebiasis and in 11 cases *silent periods* of 11–22 years were registered. Sub-clinical cases are those with no definite signs, except perhaps muddy complexion, malaise, fatigue and furred tongue. Diagnosis in the absence of faeces examination is impossible.

Treatment.—Prior to coming under the author's treatment 48·5 per cent. had undergone prolonged emetine therapy, alone, or combined with other drugs. These figures do not support the assumption that hypodermic injections of emetine, as commonly supposed, are a certain cure; indeed, there is ample evidence that the practice of periodic emetine injections renders the Entamoeba emetine-fast and final cure more difficult. There were 7 cases of emetine intoxication in patients who had received 70–120 grains of the drug, yet who continued to manifest active symptoms with parasitic relapses.

Emetine bismuth iodide.—The dosage of gr. iii usually advocated for adults is too large and causes depression—gr. ii as individual dosage is equally effective—the total being gr. xx. Luminal proved the best sedative. In 114 cases so treated 6·1 per cent. of relapses were subsequently registered. Three extraordinarily resistant cases remained uncured after nine separate courses. Emetine periodide and auremetine proved far less efficacious. Quinoxyl (yatren; chiniofon, anayodin) by mouth and retention enema was useful in curing cases resistant to E.B.I. but in a series of 35 freshly occurring infections, relapses were subsequently registered in 22·8 per cent. Combined (synergic) treatment advocated by the author consists of a combination of E.B.I. at night with daily quinoxyl retention enemata for 10 days.

Dietetic precautions are necessary and no solid food should be permitted for 3½ hours before giving E.B.I. In 361 cases so treated there was a relapse rate of 3·7 per cent.; but this refractory residuum was subsequently cured by a further course and by increasing the strength of quinoxyl retention enema to 5 per cent. Stovarsol and carbarsone given an extensive trial proved less satisfactory. Seven cases of arsenical poisoning were recorded with the former and active Entamoeba were demonstrated in a patient undergoing prolonged treatment (gr. viii daily) with the latter. Enteroviofoim, rivanol, gavano, chaparro, conessine, kurchine hydrochloride, and kurchi bismuth iodide all proved unsatisfactory.

It is concluded that in order to attain permanent cure *therapia magna sterilisans* has to be aimed at, and this can be secured by employing the *combined treatment* by which eventual cure of all cases, however long-standing, was attained. Many cases have been continuously observed and checked for 10 years and even longer. A primary

infection is more easily eradicated than one of long standing. Periodic injections of emetine or inadequate doses by mouth render *E. histolytica* emetine-resistant. *P. M.-B.*

Dormer (B. A.) & Friedlander (J.). **Amoebiasis—Pulmonary Complications.**—*Brit. Med. Jl.* 1941. Aug. 23. pp. 258–261. With 2 figs.

Their experience in Natal leads the authors to the belief that pulmonary amoebiasis is fairly common in the coastal belt, more particularly amongst the non-European population.

It is the contention of the authors that wherever amoebic dysentery occurs pulmonary complications will be found in a high percentage of untreated cases. Amoebiasis of the lung may be primary or secondary, the former being comparatively rare.

Their cases have presented the following signs and symptoms: cough, sputum, haemoptysis, wasting, night sweats, nocturnal pyrexia resembling that of tuberculosis.

Diagnosis is effected by suggestive history, absence of tubercle bacilli, presence of eosinophilia and cysts of *E. histolytica* in the faeces, but mainly on the effect of emetine and carbarsone treatment.

Secondary pulmonary amoebiasis is the result of direct extension of an amoebic abscess of the liver which may rupture into the pleural cavity, giving rise to an empyema, but more often the diaphragmatic pleura becomes adherent, shutting off the pleural cavity and facilitating extension of amoebic infection into the lung base.

The patient complains of cough with "anchovy paste" sputum, loss of weight, night sweats, and, because of these symptoms, cases are often wrongly diagnosed as basal tuberculosis, especially in the Bantu, since it is commoner in primitive races.

Radiological Appearances.—In *primary* pulmonary amoebiasis the radiograph may present the appearance of tuberculous infiltration or bronchopneumonic consolidation. In *secondary* amoebiasis of the lung there is usually well-marked opacity at the base with obliteration of the costo-phrenic angle and immobility of the right side of the diaphragm.

The septum between middle and lower lobes, usually hardly discernible on the radiograph, becomes thickened and appears as a fairly thick band limiting the inflammatory process to the base.

As in primary amoebiasis emetine and carbarsone have a rapid and dramatic effect. When an empyema is present, drainage is necessary in addition.

Seven illustrative cases are cited in support of these statements.

[Criticism may be levelled at the presentation of this paper in that the cases do not appear to have been carefully worked out. Frequent faeces examination and simoidoscopy would have probably revealed more positive evidence of amoebic infection. The statement that eosinophilia is evoked by amoebic infection is open to serious doubt. In the cases cited the eosinophile counts were from 5 to 10 per cent. In indigenous natives of a semi-tropical country such counts are quite common and cannot be called excessive. [See this *Bulletin*, 1924, Vol. 21, p. 22.] *P. M.-B.*

WYATT (Thomas E.) & BUCHHOLZ (Ransom R.). **Amebiasis Cutis.**—*Ann. Surgery.* 1941. Jan. Vol. 113. No. 1. pp. 140–152. With 9 figs. [33 refs.]

Two more cases of *E. histolytica* infection of the skin—cutaneous amoebiasis—are detailed by the authors who have collected 28 recorded in the literature and of the latter brief notes are given in this article. Cases are classifiable into four groups: 1. Those following drainage of amoebic hepatic abscess; 2. Those following drainage of a ruptured appendix, or faecal fistula, pericolic abscess or colostomy; 3. Perianal amoebiasis associated with amoebic colitis; 4. Cases not directly connected with viscera (this group the present authors do not discuss). The total is now thirty, and a noteworthy point in the two last is that both occurred after operation for liver abscess, but in neither were amoebae found in the stools. The first was a negress of 63 years who died in spite of the administration of emetine hydrochloride and other forms of treatment; the second was a man of 34 years who presented a truly terrible condition—a gangrenous process which extended over the whole abdominal wall. He left hospital, cured, after a stay of 16½ weeks. MANSON-BAHR has noted that the response to emetine of patients with cutaneous amoebiasis is usually good, and at times "instantaneous and almost miraculous." *H. H. S.*

WRIGHT (H. W. S.). **The Surgical Complications of Amoebic Dysentery.**—*Brit. Med. Jl.* 1941. Aug. 23. pp. 261–263.

HARTMAN (Howard R.) & KYSER (Franklin A.). **Giardiasis and its Treatment: a Clinical Study.**—*Jl. Amer. Med. Assoc.* 1941. June 28. Vol. 116. No. 26. pp. 2835–2839. [17 refs.]

The paper discusses 100 cases of *Giardia intestinalis* infection in which the commonest symptoms were diarrhoea and abdominal pain. In 52 of the cases the flagellate was the only apparent cause of the diarrhoea. In 11 of the cases there were no symptoms which could be attributed to it, the organism being discovered during routine examinations. In other cases of the infection there were definite lesions to account for symptoms. In 13 cases which are described in some detail it would appear that the *G. intestinalis* infection was the cause of the disability complained of and this conclusion is borne out by the fact that definite relief followed eradication of the infection. Of the 100 cases 46 were treated with atebrin (0·1 gramme three times a day for five days) [see CULBERTSON, below] but in only 35 of these was it possible to carry out post-treatment examinations. Of the 35 only one failed to respond to the treatment, the infection being entirely eliminated in 34. *C. M. W.*

CULBERTSON (James T.). **Specific Chemotherapy of Giardia Infections.**—*Jl. Lab. & Clin. Med.* 1941. June. Vol. 26. No. 9. pp. 1465–1470.

The paper describes the successful treatment with atebrin of two cases of *Giardia intestinalis* infection, one of which had been of five years' duration. The drug was administered orally, two 0·1 gm. tablets being given each day for five days. Experiments on *G. muris* in rats and mice showed that atebrin was equally effective in ridding the animals of their infection. Other protozoal parasites of the rats were

not affected. The allied substance acriflavine also cured rats of *G. muris* infection but it was more toxic to the animals than atebrin.

C. M. W.

Liu (H. L.). **Balantidium Infection in Man. Report of a Case from Chefoo.**—*Chinese Med. Jl.* 1941. May. Vol. 59. No. 5. pp. 476–479. With 3 figs. on 1 plate.

During the treatment of a child two years of age for kala azar at the Temple Hill Hospital, Chefoo, N. China, there was occasion to examine the stools because of persistent diarrhoea. A *Balantidium coli* infection was discovered. This yielded to treatment with Spirocid. It is noted that, though pigs are very commonly kept in China, human infections with the ciliate are of rare occurrence, only four previous cases having been reported. *C. M. W.*

BACILLARY DYSENTERY.

Manson-Bahr (P.). **Treatment of Dysentery.**—*Med. Press & Circular.* 1941. July 23. Vol. 206. No. 4. pp. 64–68.

An article for General Practitioners. "Dysentery" implies the presence of blood and mucus in the faeces. In Britain this usually denotes ulcerative colitis in those under 40, and malignant disease in those over this age. Ulcerative colitis is better diagnosed by feeling the resistant, granular surface by digital examination than by proctoscopy, and is better treated by a bland, high protein diet than the reverse. Of the other remedies, blood transfusions and 5 per cent. bismuth subgallate in olive oil per rectum are the best.

True dysentery is by no means uncommon in England, and the bacteriological diagnosis is of practical importance. Incompletely cured cases are a potent means of spreading epidemics. Sonne infections are protean in their clinical manifestations, and the organisms can only be isolated from freshly passed stools or, better, from fresh rectal swabs. There have been many serious outbreaks of Flexner dysentery, especially in institutions in the early autumn. The presence of many pus cells and a few histiocytes containing red blood cells in the stools is a valuable method of making the diagnosis. Antidysenteric serum should be reserved for the more severe cases; replacement of fluid lost, colloidal kaolin and sodium sulphate are all that is needed for the milder cases. Sulphaguanidine (sulphanilyl guanidine) will probably take an important place in treatment in the future. Amoebic dysentery is not uncommon in those who have been in the tropics, and is not nearly so dangerous as is often supposed. It may mimic many abdominal diseases, one of the main traps being the simulation of carcinoma by granulomata. Amoebae can be found in scrapings from these. Emetine injections are effective in the acute stage of the dysentery, and in metastatic abscesses, but emetine-bismuth-iodide is necessary for the chronic stage. Two grains should be given at 10 p.m., preceded by one grain of phenobarbitone, nightly for 10 nights, and this treatment may well be combined with seven-ounce rectal injections of 2 per cent. quinoxyl solution. *Charles Newman.*

ANDERSON (David E. W.) & CRUICKSHANK (Robert). **The Treatment of Bacillary (Flexner) Dysentery with Sulphanilylguanidine. With a Note on the Preparation of the Drug, by** James WALKER.—*Brit. Med. Jl.* 1941. Oct. 11. pp. 497–501.

BRITISH MEDICAL JOURNAL. 1941. Oct. 11. p. 514. **Sulphanilylguanidine as Intestinal Antiseptic.**

Tests *in vitro* of bactericidal activity of antiseptics afford no guide to their usefulness in suppressing bacteria in the gut, but the bactericidal action on normal intestinal flora is the most useful index for therapeutic trials. From December 1940 to June 1941, an opportunity occurred of giving sulphanilylguanidine a therapeutic trial in an epidemic of Flexner dysentery in a mental hospital. In this particular outbreak the infection was more than usually severe and protracted; the prevalent type of organism being *Bact. dysenteriae* (Flexner Z, and later, Flexner X).

Ninety-six cases were selected of which 41 were treated with this drug and 55 remained as untreated controls. The patients varied in age from 25 to 76 years; the majority were over 50; 40 were males and 56 females. Many were in poor physical condition. The drug was given in powder form as a suspension in water or milk, was found to be tasteless, and did not produce any nausea or vomiting. At first the dosage was 6 gm. daily (in three doses of 2 gm.) for four days, later 9 gm. daily (in three doses of 3 gm.) for two days followed by 4 gm. a day (in two doses of 2 gm.) If the diarrhoea was uncontrolled in four days, the maintenance dose of 4 gm. a day was continued for one week. All these are smaller doses than those recommended by MARSHALL *et al.* [see this *Bulletin*, 1941, Vol. 38, p. 597]. Further experience has shown that larger doses can be safely used in more severe cases of dysentery.

Cases, treated and untreated, were divided into two groups, severe and mild. The criteria for the former were—high initial pyrexia (101°–105°F), frequent stools and toxic prostration. Of 41 treated cases 28 were severe and 13 mild; there being a higher proportion of the former in the treated than in the untreated groups. Two deaths were registered in the treated and three in the untreated series. The criteria of response to sulphanilylguanidine were change in character and frequency of stools, rapid fall of temperature and disappearance of toxic symptoms. It was found that the number of motions was less reliable in this respect than the disappearance of blood and mucus from the stools. In the severe cases the average time was 3 days from onset, with a range of 2–5 days: amongst the severe untreated cases the average duration was 6–8 days. There were outstanding cases with critical fall of temperature apparently in response to drug therapy. In a typical severe case improvement was noted within 24 hours, and convalescence was shorter than in the untreated.

In the treated group of severe cases five suffered slight relapses with blood and mucus in the stools for one or two days. All occurred within a week of the cessation of drug therapy and probably represented true relapses. In only one was the Flexner bacillus isolated during the relapse. Treatment was controlled by daily bacteriological examination of rectal swabs (by rectal speculum and loop). The material obtained, mucus with little faecal matter, was cultured on MacConkey medium, or subsequently on a desoxycholate agar (a modification of the Difco S.S. formula, details to be published at some

future date) which gave a much higher percentage of positive isolations (Flexner)—92·5 per cent. as against 61·4 per cent. With this new medium, which detects relatively small numbers of pathogens in faeces, it was possible to assess the value of sulphanilylguanidine in eliminating these bacilli from the bowel.

Of considerable importance is the effect of this drug in preventing the convalescent carrier state, especially when it is given in the acute stage, but if it is administered *after* the cessation of diarrhoea it is less likely to influence the carrier state, as the drug will now encounter much more organic matter and an increased number of saprophytic organisms in the bowel. This has been the experience with sulphanilylguanidine in the treatment of Sonne dysentery, in which convalescent carriers are common. Thus, of 43 faecal specimens examined from 16 treated patients after the seventh day of disease, 4 only were positive, whereas 14 out of 54 similar specimens from 17 untreated patients were positive.

The average concentration of the drug in the blood, examined about two hours after the last dose of 2 gm. and a total of 6–12 gm. in the previous 24 hours, was 1·55 mgm. of free sulphanilylguanidine and 2·27 mgm. of the total drug per 100 cc. The drug concentration at twenty-four hours for free sulphanilylguanidine was from 0·5 to 3 mgm., and for total drug from 0·75 to 6 mgm. per 100 cc. These figures when compared with blood levels after similar doses of other sulphonamides show that sulphanilylguanidine is poorly absorbed from the bowel and that the amount absorbed bears some relation to the dosage given.

The urinary concentration on the fourth day after treatment averaged 94·3 mgm. per 100 cc. for free drug and 150·2 per 100 cc. for total drug, which indicated that the absorbed fraction was being readily excreted. The concentration rose to maximum between twelve to thirty-six hours after commencing treatment. There was no evidence that the drug was retained in the tissues for any time after absorption.

With one exception no clinical evidence of toxicity was noted; in this case a morbilliform rash occurred on the twelfth day of treatment in a patient who had received a total dosage of 58 gm.

Sulphanilylguanidine crystals, in the shape of narrow rectangles, were present in the urinary deposits of 21 of 28 patients and the presence and amount of crystalline deposit bore a close relationship to the urinary drug concentration. Investigations on the white cell counts of treated cases showed that the drug in therapeutic doses has practically no toxicity for the tissues.

Preparation of Sulphanilylguanidine.—Condensation of acetylsulphanilyl chloride with guanidine nitrate in the presence of a large excess of sodium hydroxide yields acetylsulphanilylguanidine, which is subsequently hydrolysed with hydrochloric acid to free sulphanilylguanidine. As initially obtained this forms a pasty white solid which tenaciously retains water and drying is a slow process under ordinary conditions. *P. Manson-Bahr.*

BROWNLEE (George) & TONKIN (Isabel M.). **Sulphanilylbenzamide in the Chemotherapy of Bacillary Dysentery.** [Correspondence.]—*Nature.* 1941. Aug. 9. Vol. 148. No. 3745. pp. 167–168.

The authors show that sulphanilylbenzamide, though absorbed from the intestinal canal of the rabbit one and a half times as much

as sulphanilylguanidine, is as effective as the latter in its antibacterial action on the coliform organisms of the gut of mice. Furthermore, whereas Sonne strains are resistant, and Shiga strains and typhoid bacilli somewhat resistant, to sulphanilylguanidine *in vitro*, sulphanilylbenzamide has proved highly potent in all types. Arrangements for clinical trials in man are being made. *C. W.*

Bell (G. J.). **Treatment of Bacillary Dysentery with M. & B. 693.**—*Lancet.* 1941. July 26. p. 101. With 1 chart.

An epidemic of Flexner W (two-thirds) and of Sonne dysentery broke out in a colony of mental defectives, and 16 were affected.

On the whole the symptoms of those infected with the former tended to be more severe. All cases were treated with sulphapyridine (M. & B. 693) in doses of 0·5 gm. four hourly by the mouth. The average total dose being 5·0 gm.

No symptoms of intolerance were noted and the results obtained were considered satisfactory. All cases cleared up in 36–72 hours and the effect on the pyrexia was immediate. After the passage of blood and mucus had ceased there was a period of constipation before normal stools appeared.

Dysentery bacilli were never found in any specimen later than 36 hours after the commencement of the treatment. *P. M.-B.*

Compton (Arthur). **Treatment of Bacillary Dysentery.** [Correspondence.]—*Brit. Med. Jl.* 1941. Aug. 23. pp. 280–281.

In this letter the author, who is Director of Laboratories, Alexandria Municipality, makes a plea for the use of phage in the treatment of bacillary dysentery, but although he says that " it can emphatically be stated that the treatment of bacillary dysentery presents no problem whatever provided one has at one's disposal good phage preparations and knows how to use them," he points out that phage cannot be expected to be useful except in the early days of the disease, before ulceration and invasion with secondary organisms has taken place. Commercial dysentery phage preparations are prepared usually against classical strains only, and therefore in cases which have progressed beyond the initial stage, phage preparations to cover supplementary organisms are necessary in addition to those covering the classical strains.

The treatment advised is as follows :—The patient is put to bed on a starvation diet of Vichy, Evian, or other mineral water for 24 hours. On the first day " a 2 cc. ampoule of a good dysentery and meta-dysentery phage preparation, alternating with a like ampoule of a good Salmonella and coliform phage preparation every four hours " is given. This may be repeated on the second day. The author claims that good phage acts more quickly and thoroughly than sulphapyridine, and that tenesmus disappears quickly. Phage is quite harmless. Sulphonamides may be of value in chronic cases. *C. W.*

Block (L. H.), Tarnowski (A.) & Green (B. H.). **Pectin and Nickel Pectinate in Acute and Chronic Bacillary Dysentery.**—*Amer. Jl. Digestive Dis.* 1939. Vol. 6. p. 96.

Nickel pectinate affords a valuable contribution to the treatment of bacillary dysentery. Pure pectin is quite ineffective, but nickel

pectinate possesses detoxifying bactericidal and anti-haemorrhagic properties which render it effective in the treatment of bacillary dysentery. It was tried out in 95 cases composed of two groups ; one of 10 adult females and the other of adult females and children. Definite improvement in appearance and general condition was observed in every patient.

Dosage.—Nickel-pectinate was administered in large amounts—two ounces in cereals or milk three times daily. This amount sufficed to control haemorrhage and promote detoxication. Latterly the dose was increased to two ounces every three hours. Flaky nickel pectinate dissolves readily in iced water, and with an equal volume forms an even syrupy mixture ; when this is added to four ounces of hot cocoa or milk the resulting mixture is palatable. *P. M.-B.*

ARNOLD (L.). **Bactericidal Action of Pectin and Metal Pectinates.**—*Amer. Jl. Digestive Dis.* 1939. Vol. 6. p. 104.

Various preparations containing pectin have been employed for the treatment of diarrhoea, but pectin possesses no bactericidal action. Several pectinates of nickel, cobalt, manganese, lead, zinc, copper, calcium and silver have been studied upon cultures of *Bact. coli* with appropriate controls. Silver pectinates exerted the greatest bactericidal action, but nickel pectinates are more soluble. It is concluded that metal pectinates are non-toxic, non-irritating bactericidal compounds in which the metal ion acts similarly to a colloidal compound attached to pectin as a vehicle. *P. M.-B.*

MYERS (Philip B.) & ROUSE (Alvin H.). **Pectinates, with Special Reference to Nickel Pectinates and their Therapeutic Value.**—*Amer. Jl. Digestive Dis.* 1940. Jan. Vol. 7. No. 1. pp. 39–44. [22 refs.]

Pectin is the intra-cellular cement of cell wall tissue occurring in fruits and succulent vegetables especially in lemons, oranges, grapefruit, etc. Commercial pectin is derived from the rind of citrus fruit and apple pomace. When mixed with sugar, acid or water it forms a jelly. The addition of small amounts of certain metals to pectin intensifies its colloidal properties. It is assumed that the inhibiting action of nickel pectinate on the growth of bacteria is due to ionization of the nickel, and the substance ionizes to a greater degree as the *p*H is decreased. Nickel pectinate acts as a catalyst, and this activity of nickel has been utilized for many years for promoting chemical reactions. Therefore the catalytic production of antitoxin and agglutinin by nickel pectinate is feasible and may also aid in the assimilation of vitamins. In this direction it may be curative in ulcerative colitis as in a case under the care of T. T. MACKIE in which nickel pectinate brought about complete recovery when all other measures had failed.

P. M.-B.

YAWS AND SYPHILIS.

Cuéllar (P. I. Vargas). El pian en el departamento del Valle del Cauca, Colombia. [**Yaws in Valle del Cauca, Colombia.**]—*Bol. Oficina Sanitaria Panamericana.* 1941. Sept. Vol. 20. No. 9. pp. 897–913. With 1 map in text & 11 figs. on 3 plates. English summary.

This article contains some points of interest among much that is elementary, and has been known since yaws began to be studied. The author defines the disease, gives an account of its history, its geographical distribution [see Guerra, below], considers race, sex, age, atmospheric conditions, clothing, food, etc., as they are thought to influence acquisition of infection, insect vectors, the spirochaete, its discovery, morphology, staining characters, distribution in the body, pathological histology of lesions, clinical description of lesions and treatment. The editor of the *Boletín* states that he has been obliged to abbreviate the article for want of space.

The following points may interest readers of this *Bulletin.* In Colombia the regions of heaviest incidence are the moist warm areas near the river mouths, but it occurs also in Tolima, a dry district. In the author's experience Indians seem to have some natural resistance, for among 1,281 patients only two were cholo Indians; two others who were inoculated with yaws did not develop any symptoms for six weeks and had no sequelae. He has noted a coincidence between yaws prevalence and lack of vitamin C, and, the converse of this, refractory cases would improve markedly when vitamin C was given without specific treatment. As regards transmission he mentions among other means sexual intercourse and bats [he mentions a case where the primary lesion was at the site of a bat's bite, but as direct contact, or insects, *e.g.*, Hippelates, may transmit infection, it is quite possible that the wound may have become secondarily infected, as the lesion did not appear for 1½ months]. He gives a list of symptoms, mentioning 32; some at least are not characteristic, such as anchylosis, bone pains, fractures. He remarks on the need for general, as apart from specific, treatment—eradication of parasites, of malaria and vitamin deficiency and notes the low fatality rate—no deaths among his 1,281 patients, and only one among 2,000 in another area. *H. H. S.*

Congo Belge: Rapport sur l'Hygiène Publique au Congo Belge pendant l'Année 1939 [van Hoof (L.)].—[**Yaws** pp. 46–47.]

During 1939 some 316,220 cases were treated in the Colony as a whole. The itinerant services, including Foréami, discovered 64,386 new cases, the heaviest figures being recorded from the Provinces of Coquilhatville, Stanleyville and Costermansville. It is noted that in those areas in which treatment has been given on a large scale for several years the infection rate is rapidly reduced and that the incidence of tropical ulcer similarly falls. *C. W.*

Rutter (Allen G.). **The Incidence and Treatment of Yaws in the Western Solomon Islands.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. May 27. Vol. 34. No. 6. pp. 429–444.

Tumbelaka (J. F.) & Soetopo (M.). Framboesia-infectie op pokpuisten. [**Yaws Infection of a Vaccinia Pustule.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. Nov. 19. Vol. 80. No. 47. pp. 2745–2748. With 3 figs. on 1 plate. English summary (4 lines).

[There is no obvious reason why a vaccination pustule, if left uncovered, should not be the site of an inoculated yaws sore, but from general observation it is sufficiently uncommon to be worth recording, especially as the secondary yaws eruption might be erroneously diagnosed as generalized vaccinia occurring late.] The authors report the cases of 5 children in whom the "mother yaw" developed on a vaccinia pustule. One showed an atrophic scar at the primary site, but a generalized yaws eruption. Diagnosis in others was confirmed by finding *Spirochaeta pertenuis* in serum from the lesion.

H. H. S.

Soetopo (M.). Leproide uitslagen bij framboesia. [**A Rash simulating Leprosy in a Case of Yaws.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1940. July 16. Vol. 80. No. 29. pp. 1765–1768. With 4 figs. on 1 plate. English summary (4 lines).

A man of 25 years presented himself on account of a rash on the extensor aspect of the left upper and fore-arm; there was a small deposit on the left shoulder and the right nates. He denied ever having had syphilis, but had suffered from yaws in his youth. Examination of exudate revealed no lepra bacilli nor spirochaetes, but the Wassermann and Sachs-Georgi tests both gave a strong positive, due, it is supposed, to the old yaws. A section of the lesion examined microscopically did not show the usual changes of yaws, but a mucoid degeneration of the deeper layers of the skin. The eruption was painless and non-irritating. [It is not very clear why this condition should be called "leproid," for careful examination failed to reveal "any other sign of leprosy"; whether the denial of syphilis has much weight in the face of a strongly positive Wassermann reaction in a man of 25 years who had had yaws as a child is a doubtful point; as a rule the W.R. in a yaws patient becomes negative at or before puberty, and a positive thereafter is rather indicative of syphilis.]

H. H. S.

Oomen (H. A. P. C.). Over framboetische afwijkingen van de neusholten. II. Vergelijkende diagnostiek. Analyse van de gangosa-syndromen. [**Lesions of the Nasal Cavity in Yaws; Analysis of the Gangosa Syndrome.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. Apr. 15. Vol. 81. No. 15. pp. 810–830. With 4 figs. on 1 plate. [19 refs.] English summary.

"Various diseases contribute to the clinical picture known as 'gangosa' or 'rhinopharyngitis mutilans.' These names are

to be reserved for chronic inflammations of destructive character, situated within, or in the neighbourhood of, the nasal cavities. The scope of this study is to determine the distribution of their different causes in Northern Celebes and to explore the congruences and differences between the relative diseases.

" In 99 of the 160 reported cases deformities (scars, retractions, perforations) were prevailing ; in 61 cases there were only inflammatory processes (granulomata, ulcers) present. From both groups 71 resp. 11 had to be ascribed to tertiary yaws, 15 resp. 14 to rhinoscleroma, 13 resp. 30 to leprosy. From the second group only : 1 to syphilis III, 2 to tuberculosis and 3 to reticulo-sarcoma. Furthermore 15 cases pertain to ozaena.

" The most serious deformities and retractions were met with in yaws, the nasal process often being the only tertiary manifestation of the disease. When exact denomination is necessary the name ' rhino-rhinopharyngitis mutilans framboetica ' should be preferred to the mentioned historical identifications.

" In leprosy, internal and external deformities of the nose and the nasal pharynx only proved to be present in serious and advanced cases. Leprous destructions may reveal close resemblance to lesions of framboetic origin. The detection of lepra-bacilli and the presence of other leprous lesions must give here decisive information. The indications provided by the syphilitic serum tests in these cases, are of minor importance.

" In rhinoscleroma too, after many years of healing from the nodular lesions, mutilations may be present. Generally, however, they are neither so serious nor so extensive as in yaws. During the active stage of the disease, the causing klebsiella may be isolated, and the complement fixation test is positive.

" If syphilis is suspected, great importance must be assigned to the environment and the history of the patient. Nasal lesions caused by hereditary syphilis may be expected before or in the second decennium of life ; tertiary manifestations of the acquired disease not long before the fourth. The nasal manifestations of tertiary yaws, however, frequently have their most active stage within the third decennium.

" As compared with the already mentioned diseases, ozaena must be defined as a superficial symmetrically diffused affection, whereas tertiary yaws habitually manifests itself in several severe local processes.

" In burnt out cases of yaws the serum tests may be found negative even without previous treatment. Perhaps this may be true too with the complement fixation test in corresponding cases of rhinoscleroma.

" Liable to cause the greatest diagnostic difficulties are incipient lesions as granulomata or ulcers. The infiltrations as observed in the beginning of tertiary yaws, of syphilis, of rhinoscleroma, of leprosy and of reticulo-sarcoma frequently present a striking mutual resemblance. For this reason, serological, bacterioscopic, bacteriological and histological investigations are indispensable for specific diagnosis and treatment.

" None of the reported cases seemed to have any relation to lupus, in other countries the commonest cause of such deformities. But for 3 exceptions, the etiology of the affection could be reasonably proved ; it is improbable that the remaining cases pertain to some other, not reported cause."

Angulo (Luis Nájera). Sobre un caso de gundú en la Guinea Española. [**A Case of Goundou in Spanish Guinea.**]—Reprinted from *Africa Médica.* 1940. Oct. No. 10. 8 pp. With 1 fig.

Pronk (K. J.). De buigcontractuur aan den pink, een typisch laattertiair symptoom van framboesia tropica. [**Bow Contracture of the Little Finger, a Typical Late Tertiary Symptom of Yaws.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. July 1. Vol. 81. No. 26. pp. 1403–1407. With 4 figs. on 1 plate.

The symptom of crooked finger has already been described as occurring in yaws but does not seem to be generally known. Although not exclusively, it is most commonly found in the little finger and next most commonly in the fourth finger. The curvature cannot be spontaneously straightened although sometimes this is possible by the use of force. Other signs of yaws may be present, in the palm of the hand or sole of the foot, such as hyperkeratosis, keratosis punctata and atrophy, and the skin may be glazed. There are grounds for supposing that the primary contraction is of the skin and that the shrinkage of the joint capsule occurs subsequently. The phenomenon is one of the late tertiary stage of yaws. *W. F. Harvey.*

Guerra (Gonzalo). El pian en el litoral pacífico colombiano. Cómo debe orientarse su campaña. [**Suggestions for a Campaign against Yaws on the Pacific Coast of Colombia.**]—*Bol. Oficina Sanitaria Panamericana.* 1941. Sept. Vol. 20. No. 9. pp. 895–897. English summary.

According to estimates the number of cases of yaws on the coastal regions of Colombia exceeds 80,000, the rural areas extending along the rivers, Chocó, Tumaco and Barbacoas being most heavily infected. Suggestions for dealing with the whole country are put forward ; these include : (1) Division of the country into districts ; (2) Provision of personnel proportional to the incidence of the disease on the following lines—(*a*) A dispensary for every 1,000 cases ; (*b*) A hospital for every 15,000–20,000 ; (*c*) Four physicians (at least) for every 5,000 cases ; (*d*) Two inspectors for every 1,000 cases ; (*e*) One nurse for every 500 cases ; (*f*) Educational hygienic instruction by nurses ; (*g*) Treatment by neoarsphenamine and quino-bismol-paroxyl compound [the composition of this is not given], which have given good results on trial ; (*h*) Government to arrange for manufacture of these drugs ; (*i*) Cost of the campaign to be helped by mine-owners, since many of the yaws foci are near mining areas. *H. H. S.*

Maltaner (Elizabeth). **Reaction of Sera from Patients with Yaws in Quantitative Complement-Fixation Tests for Syphilis and Tuberculosis.**—*Amer. Jl. Trop. Med.* 1941. Jan. Vol. 21. No. 1. pp. 145–150. [10 refs.]

The author first quotes the Jamaica Yaws Commission as having pointed out that yaws is usually resistant to treatment if one may judge by the persistence of serological reactions. Also Gotay, Costa, Mandry and Payne found in about 100 cases of yaws in Porto Rico that after three years of intensive treatment with neoarsphenamine about 50 per cent. still had positive reactions to syphilitic serum tests. In order to investigate the serological reactions further, the author

obtained from Jamaica 44 specimens of serum from cases of yaws and submitted them to complement fixation tests for syphilis and for tuberculosis according to the quantitative method of the New York State Department of Health's Division of Laboratories [*Bulletin of Hygiene*, 1939, Vol. 14, p. 132]. As regards tests for syphilis, 41 of the 44 gave complement fixation reactions, and in 35 the titre was over 10. Of the 35, 12 had titres from 200 to 400 and in the same number it ranged from 100 to 200. Of the 44 cases six were untreated, and five of the sera from them had titres from 53 to 390 ; in the sixth, a primary case of one month's duration, it was only 7·9. In 26 cases in which details of treatment had been furnished the amount ranged from 1 to 12 injections. Three sera with high complement fixation titres showed marked zonal phenomena when tested by the Kahn and the Kline methods. None of the sera gave a strong reaction with tuberculosis antigen ; in all but two the titre was less than three, and in the two exceptions it was 3·5 and 3·8. In this respect the sera were unlike leprosy sera, which give strong complement fixation reactions with the tuberculosis antigen. The relatively small proportion of sera from leprosy cases which give reactions with the antigen used for syphilis diagnosis and similarly the small proportion of yaws sera which give a reaction with tuberculosis suggest that when the syphilis reaction is found in leprosy and the tuberculosis reaction in yaws it is due to coincident infection with the diseases concerned. The author attributes the syphilis reaction in yaws and the tuberculosis reaction in leprosy to the presence of common antigenic constituents in the spirochaetes of the former pair and in the acid-fast bacilli of the latter.

L. W. Harrison.

Kahn (R. L.), McDermott (E. B.) & Marcus (S.). **Effect of Temperature on Kahn Reaction. I. With Serologically Positive Sera of Lower Animals.**—*Amer. Jl. Syph.* 1941. Mar. Vol. 25. No. 2. pp. 151–156. **II. With Serologically Positive Sera of Human Syphilis.**—*Ibid.* pp. 157–161. **III. With Serologically Positive Sera in the Absence of Syphilis.**—*Ibid.* pp. 162–172. **IV. With Serologically Negative Sera in the Absence of Syphilis.**—*Ibid.* pp. 173–178. [Summary appears also in *Bulletin of Hygiene*.]

Some time ago Kahn published in *Arch. Dermat. & Syph.*, 1940, Vol. 41, p. 817 [*Bull. of Hyg.*, 1940, Vol. 15, p. 641] details of a verification test which was based on the principle that a Kahn reaction which is due to syphilis reagin is stronger at 37°C. than at 1°C. while one of what the author termed the general biologic type is stronger at 1°C. and weaker at 37°C. The present article is a development of the same theme. In the first section the blood sera of pigs, horses, rabbits and chickens were subjected to the differential test. Their reactions to the standard Kahn test at 21°C. were 88 per cent. positive or doubtful in the case of the pig sera, 91 per cent. in horse sera, 58 per cent. in rabbit, and 32 per cent. in chicken. The results of the differential tests at 37°C. and 1°C. are shown in a number of tables which demonstrate that the positive reactions to the Kahn standard test were of the general biologic type. In the second section the authors report on the behaviour of 195 sera from syphilitic persons similarly tested. Of the 195 syphilitic sera 101 gave a positive reaction with the Kahn standard test and 94 a negative. Of the positive sera, 100 gave stronger reactions at 37°C. than at 1°C., and one the

reverse. The inference was that this serum's reaction to the standard test had been of the general biologic type. Of the 94 negative sera, 92 were negative at all temperatures and 2 gave a moderately positive reaction at 1°C.

In the third section the authors report on tests, by the same method, of sera from cases of leprosy, malaria and a variety of other pathological, presumably non-syphilitic, conditions. The leprosy sera fell into two categories, syphilitic and general biologic, 16 of 44 being the former and 28 the latter. At the time of writing the authors could not say if the reactions in the case of the 16 were due to concomitant syphilis. Generally it was found that when the reaction was of the syphilitic type the standard Kahn test gave a very strong reaction, and it was necessary to dilute the serum to bring out the differences in behaviour at 1°C. and 37°C. respectively. With malarial sera the behaviour was more clean cut, and the authors give examples of the growth of the biologic type of reaction during attacks of malaria and its fading away after recovery. The authors express the hope that the verification test will prove very useful in distinguishing between Kahn reactions due to malaria and those due to syphilis in countries where the former disease is prevalent. With border-line reactions it was found that non-syphilitic sera tend to give the reaction at 1°C., both after heating at 56°C. and in the unheated state. Syphilitic sera on the other hand tended particularly to be negative at 1°C. in the unheated state.

In the fourth section it is shown that non-syphilitic sera, human or animal, giving negative reactions to the standard Kahn test fall into two categories, those which do not react at either 37°C. or at 1°C. and those which give a reaction at 1°C. In a number of tables it is shown that an important proportion of non-syphilitic sera are of this second type, and the authors say of them that they have an inherent property of giving the general biologic type of reaction. A person with serum of this type, though usually negative to the standard test, may become positive as a result of developing a febrile condition or some affection which tends to promote the general biologic type of reaction. The authors suggest that reactions to the Kahn test should not be reported merely as positive but as syphilitic or general biologic. [See also Chai, *Bull. of Hyg.*, 1941, Vol. 16, p. 413.] *L. W. Harrison.*

SPRUE.

de Figueiredo (Fernando Vaz). O primeiro caso de spruw tropical no Brasil. [**The First Case of Tropical Sprue in Brazil.**]—*Acta Med.* Rio de Janeiro. 1941. June. Vol. 7. No. 6. pp. 255–267. With 1 fig. English summary.

The author states, as the title of the paper shows, that this is the first case of sprue in Brazil [whether he means "the first to be reported" or "the first case to arise indigenously" is not stated]. The case seems to have been quite typical till near the end when certain nervous symptoms with incontinence appeared. There were the bulky, fermenting stools, the steatorrhoea, anaemia (but the colour index was low, 0·7), stomatitis and glossitis and meteorism.

Dietetic treatment with high protein, low carbohydrate and fat content was given with injections of liver extract and vitamins. The patient was a Brazilian, 28 years of age. The disease ended fatally, the length of illness is not certain as the onset was insidious, but death occurred two months after admission to hospital. At autopsy, the main unusual feature was change in the spinal cord, the presence of numerous corpora amylacea chiefly in the columns of Goll and Burdach, with granular cells containing "inclusions" which stained well with scarlet-red. Other uncommon appearances were haemorrhages in the duodenal mucosa and submucosa. There was also caseation of the tracheo-bronchial glands with tuberculosis, and atrophy of the suprarenal cortex and malarial pigment in liver and spleen. *H. H. S.*

HOTZ (H. W.) & DEUCHER (W. G.). Röntgenologische Dünndarmbefunde bei Sprue. [**Radiological Findings in the Small Intestine in Sprue.**]—*Schweiz. Med. Woch.* 1941. June 14. Vol. 71. No. 24. pp. 748–750. With 4 figs. [11 refs.]

A study of the radiographical changes in the small intestine in non-tropical sprue is based upon the assumption that the main aetiological fact lies in the presence of an unascertainable and not easily explicable *absorption-defect* of the intestinal mucosa.

As the results of many autopsies have demonstrated, the morbid anatomy does not clearly explain the peculiar intestinal dysfunction in sprue. SNELL, MACKIE, MILLER and WEBER in America have described radiological features, especially narrowing of the ileum, alternation of atonicity and spasticity, a coarsely-striated mucosal relief pattern and increased motility. LUDIN described changes in the intestinal wall of the duodenum, jejunum and ileum due to chronic infiltration, oedema of the mucosa, or atrophy. KUHLMANN observed oedema of the mucosa and stagnation of the meal in the lower ileum.

The authors of this paper have had access to eight cases of non-tropical sprue in varying stages of the disease, and have by the mucosal relief method been able to pay special attention to the mucosal pattern.

In a particularly severe case the duodenum was dilated and atonic and the mucosal pattern defective. The upper jejunal folds were broad and band-shaped with small, irregular, circumscribed lateral indentations. In the lower jejunum and upper ileum hypertonic zones were present with strong contractures and coarse striation; the mucosal relief pattern gave the appearance of coarse snow-flake spots. The ileum was hypotonic. Similar, but less severe, changes were present in five other sprue patients and in one case of symptomatic sprue secondary to a gastrectomy: in a recovered case the appearances were normal. It is claimed that the changes in the small intestine demonstrated by the radiological method are the result of intestinal hurry and interference with the normal mixing of the intestinal contents. *P. Manson-Bahr.*

ANTOGNINI (R.). Steatorrhée et lactoflavine. [**Steatorrhoea and Lactoflavin.**]—*Schweiz. Med. Woch.* 1941. Apr. 12. Vol. 71. No. 15. pp. 510–512. [29 refs.]

Steatorrhoea is no longer regarded as an expression of dysfunction of the hepatopancreatic apparatus but rather as disturbance of resorption from the intestinal tract. This is typified by three syndromes:—

1. Coeliac diseases—Gee-Herter disease (idiopathic steatorrhoea) and sprue.
2. Hypo- and avitaminosis B_2.
3. Adrenal insufficiency (Addison's disease).

1. *Coeliac Diseases.*

Dubois (1939), in views expressed in a monograph, maintains that the physiopathology lies in a definite alteration of lactoflavin absorption. But observations based on oral administration may be fallacious, from which it appears that these patients may retain, or destroy, more lactoflavin than normal subjects. In his experiments the author employed lactoflavin by the parenteral route in order to avoid the possibility of defects of absorption from the intestinal tract. In three cases of sprue ranging from 14–50 years it was noted that, in spite of overdosage, elimination in the urine showed no appreciable change and that a second phase occurs when urinary elimination is rapidly increased, corresponding with complete disappearance of faecal fat. Suprarenal extract improved the general condition, but did not affect the steatorrhoea.

2. *Hypo- and avitaminosis B_2.*

In this instance a patient who had undergone operations on three occasions for duodenal ulcer, suffered intensely from gastroenteritis, then developed angular stomatitis, glossitis, cutaneous atrophy and disseminated pigmentation—a symptom complex described by Sebrell and Butler. Here treatment with vitamin B_2 gave good results with disappearance of steatorrhoea and other manifestations.

3. *Adrenal insufficiency.*

The theories of Verzár on the relationship between steatorrhoea and suprarenal disturbance were considered. A patient presented symptoms of Addison's disease and steatorrhoea—a vitamin assay gave the following results:—The elimination of ascorbic acid after injection remained unchanged, but there was no alteration in the steatorrhoea; likewise percortone injections were without effect.

[The author considers that the action of lactoflavin can best be explained by the assumption that this vitamin occurs as a phosphorylated compound in the intestine and that in this form it exerts its effect upon fat absorption. When given by the parenteral route the phosphorylation is brought about by the reticulo-endothelial system of the liver.] *P. M.-B.*

Kark (Robert), Souter (Alexander W.) & Hayward (Joseph C.). **A Haemorrhagic Diathesis in Idiopathic Steatorrhoea: Observations on its Association with Vitamin K Deficiency.**—*Quarterly Jl. Med.* 1940. Oct. n.s. Vol. 9. No. 36. pp. 247–261. With 4 figs. [41 refs.]

A haemorrhagic state is rarely encountered in sprue, coeliac disease and idiopathic steatorrhoea, but Castle did not observe any manifestations in a study of over 200* cases of tropical sprue in Porto

* The reviewer has not met with this complication (as distinct from scurvy) in a series of over 500 cases of tropical sprue.

Rico, nor has any reference been made to it in infantile coeliac disease, nor has it been mentioned by THAYSEN (1932) in his monograph on idiopathic steatorrhoea in adults. The haemorrhagic diathesis of hypopr thrombinaemia is quite distinct from scurvy.

The patient in question, a man of 62, who had suffered for 2½ years from idiopathic steatorrhoea, suddenly developed a haemorrhagic tendency. Tingling and numbness of the hands and feet appeared and many large ecchymoses were noted, especially about the wrists, left elbow and right knee. The hands and wrists became swollen and discoloured and oedema of feet and ankles became apparent. On admission no perifollicular haemorrhages, or spongy gums, were present as in scurvy. Carpopedal spasm was present while Trousseau's and Chvostek's signs were positive. No retinal haemorrhages were observed. There was marked oedema of both legs extending up to the thighs. The urine contained 0·05 per cent. albumin, many red blood-cells and a few white cells. Blood chemistry: serum-calcium 5·0 mgm.; serum phosphorus 1·6 mgm. per 100 cc.; serum phosphatase 16 units; total plasma-proteins 3·78 gm. per 100 cc. Sugar tolerance test (50 gm. dextrose orally) showed a flat curve. Stool fat, following intake of 100 gm. of fat: 65·5 gm. excreted, of which 21·4 gm. consisted of neutral fat; 41·1 gm. of fatty acids. The faeces contained occult blood. The blood prothrombin time was determined by Quick's method (1935) by employing the method of KARK and LOZNER (1939) (varying dilutions of normal plasma with prothrombin-free plasma are set up and the Quick prothrombin time determined on mixtures containing known percentages of prothrombin). During this investigation the Quick prothrombin time of normal control plasma varied between 19 and 25 sec.—the latter figure being taken as a standard (100 per cent. prothrombin). With an extension of all haemorrhagic areas the coagulation time was prolonged to 20 min., the bleeding time was 5 min.: the blood-prothrombin concentration was approximately 15 per cent.: the blood-platelet count was 170,000 per cmm.

The patient was then given 1 mgm. of 2-methyl-1, 4-naphthoquinone (synthetic vitamin K) by the mouth. Twenty-four hours later the blood-prothrombin concentration was 70 per cent. That day he was given a further 2 mgm. of vitamin K orally and in 24 hours the blood-prothrombin time was normal: the blood coagulation time 3½ min. and bleeding time 1½ min. From this time forward there was no further extension of the haemorrhagic areas. The haematuria dramatically cleared and gross blood disappeared from the stools. Thereafter his condition remained variable, after an accidental cut, the prothrombin rate again fell, but was rapidly restored by further synthetic vitamin K.

During a further relapse some five months later, intravenous injection of 1 cc. of isotonic solution of a water-soluble derivative of vitamin K (subsequently repeated) was given; the blood-prothrombin rate was restored to normal and maintained at this level by oral administration. Experiments *in vitro* with synthetic vitamin K added to citrated plasma showed that the single addition of this substance to plasma containing reduced quantities of prothrombin failed to raise the prothrombin concentration. This would suggest that the effect of naphthoquinone in raising the blood-prothrombin concentration in patients with hypoprothrombinaemia is not the result of a single chemical reaction.

Dam (1935) described a deficiency disease of chicks which was cured by addition of a fat-soluble material to the deficient diet. This disease, characterized by a haemorrhagic tendency of a haemophilic nature, was later shown by Dam, Schønheyder and Tage-Hansen (1936) to be associated with a hypoprothrombinaemia. This returned to normal with remission of the haemorrhagic state, when the fat-soluble material (vitamin K) was administered. It has now been established by Almquist and Klose (1939) that many of the naphthoquinone derivatives exhibit vitamin K activity, but that 2-methyl-1, 4-naphthoquinone is the most active.

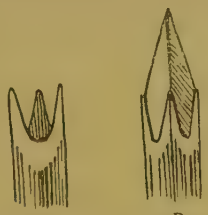
In idiopathic steatorrhoea the deficiency arises as result of a combination of factors, insufficient intake, impaired absorption, and increased loss by excretion of vitamin K. The first is, probably, the most important single cause in patients in whom the fat intake has been restricted over a prolonged period. Whilst a mild vitamin K deficiency can arise in patients with steatorrhoea taking mixed diets, the severe haemorrhagic manifestations of marked hypoprothrombinaemia do not occur until the patients have for long been on a fat-free diet. It is, therefore, advisable to supplement such therapeutic alterations in diet with maintenance doses of vitamin K or one of its analogues. *P. M.-B.*

British Medical Journal. 1941. Nov. 22. pp. 731–732.—**The Sprue Syndrome.** [18 refs.]

MISCELLANEOUS.

Franseen (Clifford C.). **Aspiration Biopsy, with a Description of a New Type of Needle.**—*New England Jl. of Med.* 1941. June 19. Vol. 224. No. 25. pp. 1054–1058. With 4 figs. [24 refs.]

The author describes a needle by means of which he removes portions of tumours for microscopic examination. [In principle it is very like the needle described by Iversen and Roholm, *Acta Med. Scandinavica*, 1939, Vol. 102, p. 1, which was used to remove portions



A B

Detail of the tip of the author's needle, with the obturator withdrawn (A) and inserted (B).

[Reproduced from the *New England Journal of Medicine.*]

of liver tissue in the study of jaundice, and it is perhaps possible that some such instrument may be of value in the study of yellow fever, in that portions of tissue may be removed from the living subject. The

reviewer has in mind particularly the mild and atypical forms of yellow fever, but realizes that in such cases there may be no characteristic appearances in the liver.]

At the tip of a 14-gauge needle, with the obturator in place, are made three bevels, as in the figure. The needle, with obturator in position, is introduced into the tumour, the obturator is withdrawn and a 20 cc. syringe attached. The whole is then pushed further into the tumour by a rotatory movement, the plunger of the syringe being slightly withdrawn to create a vacuum. Pieces of tissue are easily dislodged and on withdrawal of the needle are sucked into the barrel of the syringe. They are then prepared for section, and enough is usually obtained to be of use in diagnosis. *C. W.*

GEAR (James). **Tropical Diseases on the Witwatersrand.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1941. Feb. Vol. 20. No. 226. pp. 55–62. [16 refs.]

WINGFIELD (Alec). **Hyperventilation Tetany in Tropical Climates.**—*Brit. Med. Jl.* 1941. June 21. pp. 929–930. [16 refs.]

Nearly twenty years ago, in 1922, the importance of hyperventilation was recognized as a cause of tetany; and in 1932 MCCANCE showed that attacks of overbreathing, which might almost escape casual observation, might induce tetany in certain persons. It is thought that overbreathing washes out CO_2 from the blood and produces an alkalosis.

The author records the case of a ship's engineer, in good general health, who in the heat of the Persian Gulf, suffered from profuse perspiration followed by tingling, cramps and tetany. Thinking that the condition might have been due to hyperventilation, he was told to breathe quickly and deeply; in 2¼ minutes he felt tingling in hands and feet, and in another half minute the hands developed tetany contraction, *main d'accoucheur*. The blood calcium was only 8·3 mgm. per cent. Later, similar attacks were induced in the same way.

More work on the subject of tetany and hyperventilation in tropical climates is called for. *H. H. S.*

WILCOCKS (Charles). **Heat-Stroke and Allied Conditions.**—*Practitioner.* 1941. July. Vol. 147. No. 1. pp. 463–468.

This is a brief résumé of modern opinion on a subject which, in view of the conditions of mechanized warfare, and of the campaigns now being conducted, is of considerable importance at the present time.

C. W.

LANDOR (J. V.). **Typhoid Fever. With Special Reference to the Value of New Antisera in Therapy and Eosinopenia in Diagnosis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1941. July 3. Vol. 35. No. 1. pp. 1–11. [14 refs.]

This paper purports to analyse 463 cases of typhoid fever admitted to the General Hospital, Singapore, in the course of an epidemic during the months May to August 1938. Thirty-seven cases were discarded on the grounds of inconclusive diagnosis. Diagnosis of the remainder

was considered proved by the occurrence of a long febrile illness associated with one or more of the following signs : a positive Widal reaction, isolation of *Bact. typhosum*, occurrence of gross ileal haemorrhage, perforation of intestinal ulcer, the post-mortem finding of typhoid ulceration of the bowel.

Only two of the patients were Europeans, and none was under two years of age. In general the clinical manifestations were severe, peripheral neuritis and encephalitis being not uncommon. Other frequent complications were parotitis, otitis media and pneumonia. The case fatality rate was 22 per cent., toxaemia being the commonest immediate cause of death. Twenty-eight of the cases were in children under six years of age, of whom only 11 per cent. died, 41 boys between 7 and 12 years of age had a case fatality percentage of 17.

Treatment consisted of absolute rest in bed on a light fluid or semi-fluid diet including milk. Sulphonamide was tried in a few cases, but, no conspicuous benefit being noted, it was not persisted with. Forty-three selected cases, 25 being under 14 years of age, showing signs of acute toxaemia were treated with GRASSET's anti-typhoid serum, the average amount given to each case being 31 cc. Of these cases 12 were fatal (27·9 per cent.). Later in July and August, 17 other very toxic cases, 10 of the patients being between 6 and 13 years of age, were given FELIX's serum containing Vi antibodies, the average amount per case being 55 cc. Of these, only one died. It is pointed out that although the last group of cases occurred towards the end of the epidemic, the mortality rate amongst untreated cases during the same period showed no diminution.

Differential white cell counts were performed on 43 of the cases, and in 37 of them no eosinophils were seen ; 200 cells was the usual number counted on each occasion. Control counts on 100 consecutive cases of other diseases taken at random showed no eosinophils in 31 cases. The author concludes that eosinopenia is of value in diagnosis but is not an absolute sign.

In conclusion emphasis is laid upon the desirability of compulsory anti-typhoid immunization in Malaya, and attention is drawn to the advantages of inoculation of small doses of typhoid vaccine by the intradermal route for the maintenance of immunity already initiated by the usual subcutaneous inoculum. In two cases immunized in this way the local and general reactions were slight while satisfactory H agglutination responses were obtained. *L. J. Davis.*

EARLE (K. Vigors). **Tropical Ulcer of the Toes.**—*Jl. Trop. Med. & Hyg.* 1941. July 15. Vol. 44. No. 14. pp. 88–89.

Tropical ulcer may affect the toes proper, the interdigital clefts, or the nail beds. Ulcers affecting the toes, especially if situated on the dorsum, may involve tendon sheaths or even joint cavities ; those of the plantar surfaces rarely penetrate deeply. Most of these ulcers occur, in Trinidad, in those who go barefoot. Treatment is essentially the same as for ulcers in other places [see this *Bulletin*, 1941, Vol. 38, p. 416].

Interdigital tropical ulcers occur almost exclusively in those who wear shoes, and there is usually present a fungus which provides the initial lesion. The ulcers may spread dorsally, along the sides of the toes or along the plantar surface.

The nail beds may be involved from a dorsal ulcer (usually in persons who wear shoes) or from an ulcer starting at the distal part of the toe and extending under the nail (almost invariably in those who go barefoot). In both cases the first step in treatment is complete removal of the nail and curettage of the nail bed. Amputation should be performed if ainhum also exists. *C. W.*

RIOU (M.). La sulfamidothérapie de l'ulcère phagédénique tropical. [**Sulphonamides in the Treatment of Tropical Phagedaenic Ulcer.**]—*Rev. Méd. Française d'Extrême-Orient.* 1940. Aug.–Sept. No. 7. pp. 342–351.

The author holds the view that tropical ulcer is essentially a streptococcal ulceration of the skin, with spirochaetes and fusiform organisms as common secondary invaders. The treatment advised consists of several stages. Curettage is not always successful in cleaning the ulcer, and the author prefers a method in which Dakin's solution or potassium permanganate solution (strengths not stated) or other mild antiseptic is allowed to drip on to the ulcer from a height of 50 to 75 cm. at the rate of 40 to 60 drops each minute for 3 or 4 hours once or twice each day. This treatment is effective in transforming the bed of the ulcer into a clean granulating surface.

Sulphonamide drugs need not, in all cases, be given by the mouth; oral administration may be reserved for acute cases with abundant suppuration and rapid destruction of tissue. Powdered sulphapyridine may be applied to the ulcers, but this method is not free from disadvantages, and is expensive. A satisfactory paste for local application is as follows:—

Powdered sulphapyridine	8–10 gm.
Zinc oxide...	15 gm.
Calcium carbonate	15 gm.
Cod liver oil	35 gm.
Lanolin	25 gm.

and analgesics may be incorporated if necessary. The paste is most beneficial at *p*H 4·8. It is applied under cellophane, which provides perfect occlusion.

Skin grafts are useful; they may with advantage be covered with the sulphonamide paste.

Treatment of malaria, ankylostomiasis, avitaminosis and syphilis should be carried out if these conditions are present; for the last, bismuth is preferred to mercury or arsenic when there is osteoperiostitis near the ulcer. Vitamin A and ascorbic acid are valuable adjuncts to general treatment. *C. W.*

BRANDT (Robert). **Spontaneous Healing and Progression in Untreated Venereal Lymphogranuloma.**—*Venereal Dis. Information.* 1941. July. Vol. 22. No. 7. pp. 248–253. [Summary appears also in *Bulletin of Hygiene.*]

Brandt suggests that since many persons who give positive Frei reactions have neither history nor symptoms of L.i., the original lesions must have healed without treatment and been forgotten. This is supported by the fact that occasionally in such cases scars are found in the groin. Also, according to the author's experience in a clinic in Georgia, U.S.A., patients often disappear after buboes have been

aspirated or skin tests have been performed, and they would have returned if the lesions had not resolved. He re-examined 41 untreated cases and found that 16 showed evidence of healing, 25 remaining uncured. He considers that the 16 do not represent the true proportion of the spontaneously healed cases since the majority of such disappear from observation, and these were only cases specially called up to the clinic or found accidentally. He gives details of the 16, who were examined from 2 months to 4 or more years after first being seen. In 8 of them there was no scar and in 7 only a scar and the skin reaction remained as evidence of the infection; in the 16th case, 3½ years after the first appearance of the disease, the glands remained swollen and matted together. The author points out that all the 16 cases had had buboes, and he thinks that the absence of bubo diminishes the tendency to spontaneous healing. This view is supported by the fact that, of the 25 patients who showed no sign of healing, only 11 had had buboes; 14 had ulcers or early elephantiasoid changes when first seen. A history of bubo is uncommon in rectal stricture, a fact which, the author says, is not accounted for by the alleged rarity of bubo in women. Torpin *et al.*, in a series of 97 consecutive cases of L.i. in women, found evidence of bubo in 33. On the other hand in 42 women with rectal stricture only 3 gave a history of bubo. In Brandt's clinic, of 46 women with L.i., 32 had buboes and 14 had ulcers with little or no involvement of the inguinal glands. The author considers that evidently the bubo affects the healing of lesions in other parts of the body, witness the healing of the genital ulcer as soon as the bubo appears. It is evident also that early acute inflammation other than bubo has the same effect though in smaller degree as most rectal strictures develop without any early preceding manifestation. Of two untreated males with penile lesions but no bubo, one developed elephantiasis and the other a progressive destructive ulcer. The spontaneous healing of L.i. lesions has to be kept in mind in evaluating therapeutic measures. *L. W. Harrison.*

Steyn (Douw G.). **The Poisoning of Human Beings by Wild Plants, Ornamental Plants and Domestic Poisons.**—*Public Health.* Johannesburg. 1941. June. Vol. 5. No. 4. pp. 13–14, 16, 18, 20–23, 25–6. With 17 figs.

The author does not deal in any great detail with the many poisons he mentions. He divides them for purposes of description into: Poisonous garden plants, wild plants and weeds, fruits and vegetables, and domestic poisons. The first two groups only are of interest to readers of this *Bulletin*, in fact, the reasons for including the latter two are not clear. Under "fruits and vegetables" he speaks of gastro-intestinal disturbances in children set up by their eating unripe melons, cucumbers, green apples and the like, and under "domestic" the inadvertent ingestion of "beetle powders" containing phosphorus or arsenic, of solid fuel "meta," of the swallowing of "Pharoah's serpents" (mercury sulphocyanide), of licking the paint of toys which we all are well aware of from the fate of "little Willie with his monkey," instilled into us as a warning in our nursery days.

Some of the first two groups do not call for more than a passing remark here, as they are well known to tropical workers and their effects and treatment are to be found in standard works, such, for

example, as *Nerium oleander*, *Jatropha curcas* (physic nut), Stramonium (Datura), Ricinus, and Solanum. Others, less well known, call for mention.

Melia azedarach (Lilac tree), known also as China berry, Syringa berry, Cape syringa. Fatal poisoning has occurred from eating the berries, the symptoms being those of gastro-enteritis, with palpitation and dyspnoea.

Colocasia antiquorum (elephant ear, so called from the large leaves) is a verandah plant, and children sometimes eat part of a leaf and suffer from burning sensations in the mouth, with vomiting and diarrhoea.

Adenia digitata, a creeper with large subterranean bulbs and yellow fruits tinged with red. It is distributed fairly widely in the Transvaal, Zululand and Natal. The bulbs contain a glucoside which forms hydrocyanic acid, and modessine, an irritant protein poison; they produce symptoms of gastro-enteritis-nausea, vomiting, diarrhoea with passage of blood—weakness of the heart action, laboured breathing, paralysis ending in death. Similar symptoms follow poisoning by the leaves and roots of *Acocanthera spectabilis* (Bushman's or Hottentot's poison bush), a plant common along rivers and sluits in parts of the Transvaal, Natal and Eastern Cape Province. The fruit is deep purple, like a plum.

Solanum nigrum (Black Nightshade); used as emetic and by the natives for the treatment of headache, wounds, skin diseases, malaria, blackwater fever and other conditions. Blue-black berries are used in cakes, but green berries are poisonous. The toxicity of poisonous species of Solanum decreases as they ripen (compare the Akee fruit, *Blighia sapida*, in the West Indies and Nigeria).

Euphorbia ingens, *Candelabra euphorbia* (Naboom bush) contains an irritant latex which causes vesication of the skin and oral mucosa and may prove fatal. "Cattle which have run through a dense patch of naboom bush suffer from most severe eye-burn, while the skin on their faces is almost completely destroyed."

Senecio ilicifolius, bread poisoning, occurs as a poisonous weed on wheat lands, is harvested with the wheat and so finds its way into bread (hence the name Bread-poisoning). [See *Bull. of Hyg.*, 1936, Vol. 11, p. 849; 1937, Vol. 12, p. 898, and this *Bulletin*, 1941, Vol. 38, p. 421.] *H. H. S.*

PRUIS (G. W. A.). Gadoengvergiftiging? [**Gadoeng Poisoning?**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1941. Apr. 22. Vol. 81. No. 16. pp. 864–873. English summary.

Gadoeng is the local name for *Dioscorea hirsuti*, a plant which grows wild in Java and whose bulbs are edible. [Another species *D. hispida* occurs in the Philippines and is not infrequently a cause of food poisoning (see this *Bulletin*, 1938, Vol. 35, p. 76).] The Javan tuber is known to be poisonous and the toxic substance (which is not known) is supposed to be removed by shaving the bulbs, soaking them for 5 days, then rinsing in running water for two more days. [The toxic principle may be a cyanogenetic substance for this mode of preparation is analogous to that of cassava.] The product is dried, and before use is again soaked and steamed and eaten with rasped coconut. Incidentally, the plant is used in the treatment of syphilis.

The present case is of a girl, 18 years old, who, after eating the tuber, was seized with vertigo, vomiting and diarrhoea with passage of blood

in vomit and faeces ; she complained of burning pain in throat, oesophagus and stomach ; she also had anuria with dropsy and was dazed. Decapsulation was performed and for a short time afterwards the dropsy increased ; then the passage of urine became normal and the dropsy decreased and the mental condition cleared up. No special treatment was given, but the diet consisted mainly of fruit and glucose. Little is known concerning this poisonous food and the author regards this as a " probable case " only and queries the title. *H. H. S.*

YANG (R. T.). **Some Clinical Observations and Opinions on the Subject of Atriplicism.**—*Japanese Jl. Dermat. & Urol.* 1940. Nov. 20. Vol. 48. No. 5. pp. 103–106.

There is much that is obscure on the subject of atriplicism. When MATIGNON first described the condition in 1898 he noted that he had seen more than 20 cases in persons who developed the symptoms after eating the shoots of *Atriplex serrata* (one of the Chenopodiaceae), and he consequently regarded the condition as a form of food poisoning and called it atriplicism. The main symptoms are facial oedema, oedema of hands and forearms, disturbance of motility, sensation, and trophic lesions of the skin affected and the formation of crusts over the oedematous areas. The symptoms could be divided into four stages : 1. Infiltration. 2. Ecchymosis in the temporo-malar region with maceration of the epidermis. 3. Maceration and ulceration of the skin of the hands. 4. Scarring and keloid formation.

It was seen chiefly in Mukden in May–July, the hottest months, and among the poorer classes who took the shoots for food. The author regards atriplicism as a bad name, at all events it should not be applied until more is known of the disease. The symptoms may arise in those who have eaten not Atriplex but Amaranthus or Korchia ; they may not arise in those who have eaten Atriplex unless they expose themselves to bright sunlight ; they may be due to a small greenish-yellow mite which is found on the plant, and, according to LAVERAN, the thumb and forefinger become infected when plucking the herb, and the infection is carried thence to the mouth and face. Since it occurs in those eating the food who may have had no part in gathering it, the parasitic theory has now little support.

The author tried to infect himself and between 20 and 30 volunteers by feeding on chenopodium but without effect. One patient had often eaten it but was not affected until she exposed herself to the sun's rays during working hours when the symptoms developed typically. Since the lesions appear only on exposed parts and never on those which are covered, the author believes that the immediate cause is irritation due to the sun's rays, though the question of sensitization to sunlight by ingestion of the herb needs consideration and study. [See this *Bulletin*, 1926, Vol. 23, p. 219.] *H. H. S.*

MACGREGOR (R. G. Scott) & LOH (G. L.). **The Comparison of Basal Physiological Values in Racial Groups. Part 2. Erythrocytes, Haemoglobin Content and Cell Count.**—*Jl. Malaya Branch Bril. Med. Assoc.* 1941. Mar. Vol. 4. No. 4. pp. 385–404. With 2 figs. [46 refs.]

Erythrocyte counts and haemoglobin values were determined in physically fit males in the tropics. The groups were 90 Europeans, 60 Chinese, 70 Malays, 70 Northern Indians and 60 Southern Indians.

The means lay within the range of normal standards in temperate climates. The haemoglobin was significantly higher in the European group, and at the same time the erythrocyte count was significantly lower, that is, the mean corpuscular haemoblogin was higher in the European than the Asiatic groups. No significant differences were found between the various Asiatic groups. Twelve Europeans were tested monthly for six months after their arrival in the tropics, and they showed no variation in either haemoglobin or red cell count ; no indication was found of increase or decrease in these values during residence for longer periods. [The literature and the various factors which might affect the blood picture are discussed].

W. P. Kennedy.

MacGregor (R. G. Scott) & Loh (G. L.). **The Comparison of Basal Physiological Values in Racial Groups. Part 3. Leucocytes. (Total, Differential and Polynuclear (Arneth) Cell Counts.)**—*Jl. Malaya Branch Brit. Med. Assoc.* 1941. Mar. Vol. 4. No. 4. pp. 405–437. With 2 figs. [49 refs.]

Total and differential white cell counts and polynuclear counts (*i.e.* the modified Arneth count of Cooke and Ponder) were made from physically fit male groups in Singapore. These comprised the same five groups and the same numbers as in the preceding abstract. The means were within the range of the normal standards determined by the most critical research in temperate climates. Studies of individuals at different periods suggested that there is a reduction of polymorphs and a relative increase in lymphocytes as a result of environmental influences. When eosinophilia occurs in apparently normal persons these cells appear to replace neutrophils quantitatively, and no leucocytosis occurs till the eosinophils exceed 20 per cent. The weighted mean of the polynuclear count for 90 Europeans was 2·17, which is significantly different from the British standard of 2·74, established by Cooke and Ponder. The other groups showed even greater " shifts to the left." The mean for 20 Chinese was 1·88, for 50 Malays 1·95, for 40 Northern Indians 2·05 and for 20 Southern Indians 2·11. This confirms the observations of other workers who have reported left-handed counts in tropical countries. [The techniques in both this and the preceding paper are described in detail, and have been carried out with all precautions. The data are fully set out in extended tables. There is not, however, a detailed discussion of the climate, which in view of other work, would have been an advantage.]

W. P. Kennedy.

Gordon (R. M.). **The Jigger Flea.**—*Lancet.* 1941. July 12. pp. 47–49. With 5 figs. [18 refs.]

The paper gives a valuable summary on a matter of considerable topical interest. It should be read in the original, by medical men serving in Africa.

The jigger flea (*Tunga penetrans*) is widely spread in the American and African tropics. The egg hatches (as in other fleas) into a footless larva, which lives in dust and feeds on organic débris. When fully fed the larva spins a cocoon around itself, and turns into a pupa inside it, from which the adult flea emerges. If the flea is a female she

burrows head first into the skin of man, pig, etc., commonly in the human toe. At first she appears in the skin as a tiny dark spot which itches: later owing to development of the ovaries she becomes very greatly enlarged.

The paper emphasizes the great importance of chiggers to armies and others. If neglected or carelessly extracted very serious ulcers may result, and large numbers of men may be incapacitated. The pest is reduced by sweeping floors clean or treating them with kerosene emulsion, by foot inspections and the training of subordinate personnel in the method of extraction, and by wearing shoes at all times.

P. A. Buxton.

Omori (Nanzaburo). **Comparative Studies on the Ecology and Physiology of Common and Tropical Bed Bugs, with Special Reference to the Reactions to Temperature and Moisture.**—*Taiwan Igakkai Zassi (Jl. Med. Assoc. Formosa).* 1941. Mar. & Apr. Vol. 40. Nos. 3 & 4. pp. 555–636; 647–729. With 19 figs. [5 pages of refs.]

The author observed that in Formosa the tropical bed bug *Cimex hemipterus* alone is present, while in Japan proper only the temperate bed bug *C. lectularius* occurs. He therefore undertook a detailed comparison of the physiology of the two species which is here reported very fully. *C. lectularius* seems to be a more prolific species, less influenced by temperature. But he confirms the conclusions of others that *C. hemipterus* is more resistant to high temperatures: it will continue to breed at 36°C. whereas *C. lectularius* will not. *C. lectularius* is more resistant to low temperatures; it is little affected by temperatures as low as 3°C., while *C. hemipterus* soon dies at temperatures below 9°C. and at temperatures slightly above this its metabolism is more markedly depressed. If the species are released simultaneously on a graduated temperature plate, the tropical species aggregates chiefly around 32 33°C., the temperate species at about 28–29°C. Low temperatures seem to affect particularly the fertility of the female, high temperatures of the male.

In general, the author's results support the conclusion that whereas *C. hemipterus* cannot thrive outside the tropics or subtropics, *C. lectularius* is adapatable to tropics and temperate zones alike. The two species mate readily but the eggs so produced are abnormal and infertile. Further, the sperm of male *C. hemipterus* seem to have an injurious effect on the female *C. lectularius*. The author suggests that this may be a possible explanation for the exclusion of the latter species in Formosa. The geographical distribution of the two insects is reviewed.

V. B. Wigglesworth.

Alameda County. **Annual Report for 1940 of the Alameda County Mosquito Abatement District** [Gray (Harold F.), Engineer].—34 mimeographed pp. With 6 figs.

Lyford (Helen Stewart). **Some Reactions of a Pathogenic Flagellate, *Trichomonas foetus*, to Environmental Changes in Bacteria-free Cultures.**—*Amer. Jl. Hyg.* 1941. May. Vol. 33. No. 3. Sect. C. pp. 69–87. With 5 graphs. [22 refs.]

The paper gives the results of a careful study, extending over two and a half years, of the cultural requirements of *Trichomonas foetus*

when grown in bacteria-free media. The flagellates were maintained in tubes containing whole egg slants covered with a mixture of defibrinated blood and simple saline solutions (s-e-b medium). The cultures were kept at 37°C. and subcultures were made every 10 days. Such cultures were suitable for transfer to a liquid medium such as dextrose serum broth mixtures. The egg slant cultures were capable of several months' survival if the tubes were rubber-capped and kept at laboratory temperature. With these cultures it was possible to study the influence of temperature, the rate of growth and multiplication, the effect of changes in the *p*H of the medium, the optimum concentration of serum in the medium, and other biological characteristics of the flagellate. The results under these various headings are described and discussed in the paper, which must be consulted by those interested.

C. M. Wenyon.

Lusaka Health Department [Compiled by]. **Common Sense and the Rationing of African Labourers.**—4 pp. [Not dated.]

In this pamphlet are set out arguments which indicate that adequate nutrition of African labourers is desirable from the point of view of results obtained and of economy. Specimen diets are given, of which the following is the most comprehensive :—

" D.—As recommended by a Conference of Medical Directors.

Daily.		
(*a*) Maize meal	28	ounces
(*b*) Beans, peas or shelled peanuts	4	,,
(*c*) Palm oil or animal fat	2	,,
Weekly.		
(*d*) Meat	2	lbs.
(*e*) Vegetables	2	,,
(*f*) Salt	3½	ounces
or		
Daily.		
(*a*) Kassava meal	2	lbs.
(*b*) Beans, etc.	4	ounces
(*c*) Palm oil or animal fat	2	,,
Weekly.		
(*d*) Fish	2	lbs.
(*e*) Meat	½	,,
(*f*) Salt	3½	ounces
or		
Daily.		
(*a*) Millet or kaffir corn	32	ounces
(*b*) Beans, etc.	4	,,
(*c*) Groundnut oil or butter	2	,,
Weekly.		
(*d*) Biltong	1½	lbs.
(*e*) Beans or peas germinated	14	ounces
(*f*) Salt	3½	,,

Note : Any item in these three alternative diets may be substituted for one with the same letter in either of the other two, *e.g.*, ' (*d*) Biltong ' may replace ' (*d*) Fish.'

The addition of 2 lbs. of bone meal to a bag of meal is recommended."

There is a note on red palm oil which in its crude state is a potent source of vitamin A, and one on native beer, which is stated to contain appreciable amounts of vitamins B and C. *C. W.*

Central Mining—Rand Mines Group. Health Department Report for Year 1940 [Thompson (H. Q. F.), Acting Chief Med. Officer]. pp. 22–28. With 14 figs.—**Housing of Non-Europeans.** [Summary appears also in *Bulletin of Hygiene.*]

In recent years the housing of native labourers has been improved, largely as a result of efforts to guard against respiratory diseases, especially pneumonia. As the improvement in housing has progressed, so the mortality from pneumonia has steadily decreased. Plans and elevations are given of 14 compound rooms or houses. The old type of compound room housed 24 natives, and when this type was in common use the mortality from pneumonia was 12·3 per 1,000 *per annum* (the figure for 1940 was 0·63 per 1,000). Later an attempt was made to reduce morbidity by constructing sleeping berths of concrete and providing concrete partitions, which prevented the transmission of mouth spray on coughing or sneezing, between the sleepers. These were a great success and form the basis of the modern rooms. Later still the rooms were built to take 10 men, but a living and sleeping room for 20 has now been standardized. Designs for houses for married men are shown, some of which contain three rooms, a kitchen, a shower bath, a water closet, and verandahs. Information is given as to cost and materials used.

[This account could be read with advantage by all who are concerned with the housing of native labourers. The diagrams are beautifully reproduced.] *C. W.*

Daleas (Pierre). Essai sur l'assistance sociale aux femmes enceintes et aux nourrissons au Tonkin. [**Maternity and Child Welfare in Tonking.**]—*Rev. Méd. Française d'Extrême-Orient.* 1940. Aug.–Sept. No. 7. pp. 309–341.

This paper, by the Professor of Obstetrics in the School of Medicine in Hanoi, deals in a comprehensive manner with maternal and child welfare in the Tonking province of Indo-China.

Figures for mortality rates are given and the causes of the mortality discussed ; there follows an account of the welfare work which is being done and of the results so far obtained ; finally, suggestions are made for a programme of future action.

In Hanoi still-births, which were 61·6 per thousand births in 1925, fell to 29·09 in 1938 ; syphilis was held responsible for 38 per cent. of these stillbirths. Neo-natal mortality, which was 175 per 1,000 births in 1925, fell to 33 in 1938, syphilis causing 49 per cent. of the mortality. Deaths of infants up to one year, which were 435 per 1,000 births in 1925, were 190 in 1938 ; it is considered that 60 to 70 per cent. of these deaths after the first three weeks were due to gastro-intestinal affections.

From a survey made in certain rural areas it was found that still-births there were much greater than in the town of Hanoi, while infant mortality was less. (The areas surveyed were non-malarious.)

Adverse social factors are considered responsible for much of the child mortality ; ignorance, harmful social customs, insanitary overcrowded houses, poverty, malnutrition, and too many pregnancies in debilitated, underfed and overworked mothers.

Many infants are born prematurely (126 per 1,000 births in Hanoi Maternity Hospital), the two chief causes being syphilis and debility of the mothers.

Of measures already taken to combat the high mortality the following are noteworthy : Maternity hospitals have been built in the larger towns and in several lesser centres in the provinces ; in these 18,133 confinements took place in 1938. Trained midwives are gradually increasing in number and in influence, but as yet practise mainly in urban areas. A Health Visitors' Training School has recently been opened in which local girls are being trained.

In rural areas, where it is not as yet possible to supply sufficient trained midwives, an interesting temporary arrangement has been adopted which, it is claimed, has proved highly successful. The chiefs of the villages select young women with a "certain amount of education" who are given simple and practical instruction in the aseptic conduct of a confinement and in the recognition of abnormalities. These girls must subsequently work in their own villages, they are given small maternity homes with a few beds. These are maintained and the salaries of the girls paid from village funds. In 1938 there were 755 of these girls in practice and they attended 85,353 confinements.

Of voluntary organizations concerned with child welfare, grateful appreciation is given to the help rendered by the "Fraternité franco-indochinoise" organized by Madame le Général Catroux.

In the programme for future action the following suggestions are made : extension of general sanitary measures such as slum clearance, better drainage and better diet for the people, especially as regards nitrogenous food ; increase in maternity and child welfare centres ; training of more native health visitors, especially "polyvalent" health visitors ; education of the general population in hygiene ; increase in anti-venereal work ; and co-ordination of all societies concerned with the care of mothers and children through one central committee.

The author points out the great difference in child welfare in Indo-China from that in western countries and explains how circumstances and a study of the magnitude of the problem are forcing the authorities to neglect somewhat the unfit in order to bring their greatest efforts to bear on keeping fit children healthy. *M. G. Blacklock.*

REVIEWS AND NOTICES.

Craig (Charles Franklin) [M.D., M.A. (Hon.), F.A.C.S., F.A.C.P., Col. U.S. Army (Retired), D.S.M., etc.] & Faust (Ernest Carroll) [M.A., Ph.D., etc.]. **Clinical Parasitology.** Second Edition, thoroughly Revised.—772 pp. With 244 figs. 1940. Philadelphia : Lea & Febiger. [51*s*.]

This seven hundred page text-book is the successful product of the collaboration of two well-known American workers. After a general introduction by the junior author, each author deals with the subject lying more particularly in his own sphere of knowledge. C. F. Craig is responsible for the sections on Protozoa and Protozoan Infections, and E. C. Faust for those on Helminths and Helminthic Infections, and on Arthropods and Human disease. Each subscribes the appropriate portion of the Technical Appendix of fifty pages at the end of the book.

The matter in the text is lucid and is amply illustrated with excellent line drawings and photographs. Each parasite, after its zoological status has been discussed and described, is covered in a systematic manner in a series of paragraphs, giving its synonymy, history and nomenclature, geographical distribution, morphology, life cycle and method of reproduction, cultivation, epidemiology, methods of transmission, pathology and symptomatology, diagnosis, prognosis, treatment and prevention, where these are appropriate and justified by the importance of the parasite. A pleasing proportion has been maintained throughout in the difficult task of assessing the space devoted to each parasite. The field covered is very extensive, but is strictly limited to the parasites which have been reported from man, and the bibliography is adequate and cosmopolitan. In short, "Clinical Parasitology" may be recommended as an excellent text-book for undergraduate and graduate students of human parasitology wherever the English tongue is spoken. *A. R. D. Adams.*

MARTINDALE. **The Extra Pharmacopoeia.** Twenty-Second Edition in Two Volumes. Vol. 1. pp. xxxviii+1289. 1941. London: The Pharmaceutical Press, Bloomsbury Square, W.C.1. [27*s.* 6*d.*] [Review appears also in *Bulletin of Hygiene.*]

Although this new edition of the *Extra Pharmacopoeia* makes its appearance almost two years after the outbreak of war it retains its international outlook, and maintains the high standard of comprehensiveness and accuracy which users have come to expect of it. To make room for the inclusion of over two thousand new abstracts of the literature of the four and a half years which separate this edition from the previous one, nearly sixty per cent. of the matter has been re-set. Of the re-set material by far the greater part is new to the book, and almost every page bears evidence of careful revision.

Some changes within the general framework mark developments in recent knowledge. Thus, Ascorbic Acid, Aneurine Hydrochloride and Calciferol, which formerly appeared as subsidiary substances under such arbitrary sections as Aurantium, Cerevisiae Fermentum, and Oleum Morrhuae, have been promoted to the status of principal or parent substances and are now placed in their own respective alphabetical positions in the Materia Medica. Among new sections is one of 37 pages devoted to Sulphanilamidum.

Much information bearing on war problems has been amplified. The section on Blood Transfusion has been expanded from 3 to 10 pages, and that on Vaccines, Sera, Toxins and Antitoxins from 63 o 84 pages. The note on Ligatures and Sutures has been entirely re-written.

The up-to-dateness of the revision is noticeable. Under the headings Acidum Tannicum and Azorubrum, recent modifications in the technique for the treatment of burns with tannic acid and with gentian violet respectively, are described; the now recognized risk of constriction or distortion when tannic acid is used for burns of the face and hands is stressed; and mention is made of the growing preference for gentian violet, especially for first-aid use. The still more recent tendency to avoid even gentian violet for burns of the face and hands, and to rely on saline dressings, sulphanilamide powder, and Tulle Gras finds mention in the section on Sulphanilamidum and

in that dealing with Gossypium and Other Allied Dressings. Under Chlorinum, a British Standards Specification for Bleach Ointment, or Anti-gas Ointment No. 1, is given. As opening up an interesting new field of research, reference is made to Penicillin, a substance extracted from cultures of the mould *Penicillium notatum*, which has recently been found to possess an extremely potent bacteriostatic action even in high dilutions.

The usefulness of the Therapeutic Index of Diseases and Symptoms has been increased by adding to each entry relative to a medicinal substance a note of its appropriate page number in the body of the book, thus enabling those using the Index to run quickly through all the medicinal substances mentioned throughout the book in connexion with the treatment of any particular ailment.

The collation of the vast accumulation of material for inclusion in the *Extra Pharmacopoeia* must present a most formidable task to the Editor and his assistants, and they, and the Revision Committee, are to be congratulated on the outcome of their work. *R. L. S.*

Printed under the authority of His Majesty's Stationery Office
by the South Essex Recorders, Ltd., High Road, Ilford.

(2160) Wt. P15/247 1725 1/42 S.E.R. Ltd. **Gp. 432.**

LIST OF GOVERNMENTS CONTRIBUTING TO THE BUREAU OF HYGIENE AND TROPICAL DISEASES.

The Bureau is maintained by official grants from the following Governments given in the proportion of approximately one-sixth from Imperial funds, one-twelfth from the Dominions and the balance from the Colonies and Protectorates and other sources listed :—

Great Britain.

Commonwealth of Australia.
New Zealand.
Southern Rhodesia.
Union of South Africa.

Bahamas.
Barbados.
Bermuda.
British Guiana.
British Honduras.
British North Borneo Company.
Brunei.
Ceylon.
Cyprus.
Federated Malay States.
Fiji.
Gambia.
Gibraltar.
Gold Coast
Hong Kong.
Iraq.
Jamaica.
Kenya.
Leeward Islands.
Mauritius.
Nigeria.
Northern Rhodesia.
Palestine.
Sarawak.
Sierra Leone.
Straits Settlements.
Tanganyika Territory.
Trinidad.
Uganda.
Unfederated Malay States.
(Johore, Kelantan, Kedah and Perlis, Trengganu).
Zanzibar.

Bengal
Bihar and Orissa.
Burma.
Central Provinces.
Madras.
Punjab.
United Provinces.

Sudan.

The Bureau also receives contributions towards its maintenance from the Indian Research Fund Association.

BUREAU NOTICES.

The Director will be glad to receive early copies of works or reprints on Tropical Diseases for notice in the *Tropical Diseases Bulletin* and for the Library.

Publications of the Bureau of Hygiene and Tropical Diseases.

TROPICAL DISEASES BULLETIN

containing classified summaries of current papers and reports from the medical and scientific publications of the world on diseases of the tropics and warm countries.

(ISSUED MONTHLY.)

Subscription rate (in advance) : 21 shillings per annum post free. The subscription runs from January to December. Single numbers 2s. 6d. each.

SUPPLEMENTS TO THE TROPICAL DISEASES BULLETIN

summarizing the Annual Medical and Sanitary Reports from British Colonies. Protectorates and Dependencies.

(ISSUED ANNUALLY.)

Back Supplements can be supplied as follows :—

Dec. 1931	SUPPLEMENT dealing with the Annual Reports for	1929	Price 2s. 6d. net.
Oct. 1932	,, ,, ,, ,, ,,	1930.	Price 2s. 6d. net.
Oct. 1933	,, ,, ,, ,, ,,	1931.	Price 5s. 0d. net.
Dec. 1934	,, ,, ,, ,, ,,	1932.	Price 5s. 0d. net.
Nov. 1935	,, ,, ,, ,, ,,	1933.	Price 7s. 6d. net.
Oct. 1936	,, ,, ,, ,, ,,	1934.	Price 7s. 6d. net.
Nov. 1937	,, ,, ,, ,, ,,	1935.	Price 7s. 6d. net.
Nov. 1938	,, ,, ,, ,, ,,	1936.	Price 7s. 6d. net.
Nov. 1939	,, ,, ,, ,, ,,	1937.	Price 7s. 6d. net.
Dec. 1940	,, ,, ,, ,, ,,	1938.	Price 7s. 6d. net.

Publication of the later Supplements is temporarily in abeyance.

BULLETIN OF HYGIENE

containing classified summaries and reviews of publications on all branches of public health and preventive medicine.

(ISSUED MONTHLY.)

Subscription rate (in advance) : 21 shillings per annum post free. The subscription runs from January to December. Single numbers 2s. 6d. each.

ORDERS and SUBSCRIPTIONS may be sent direct to the

BUREAU OF HYGIENE AND TROPICAL DISEASES,
Keppel Street,
Gower Street,
London, W.C.1

or through any bookseller.

Cheques and Postal Orders should be made payable to the "Bureau of Hygiene and Tropical Diseases," and crossed "Westminster Bank Ltd."

The Bureau has from time to time obtained, by purchase or otherwise, copies of journals or monographs for its correspondents. In view of the difficulties which the ordinary agent meets in carrying out commissions of this kind, the Bureau is prepared to do its best to obtain such publications or photogram copies of particular papers, for any of its subscribers. Out-of-pocket expenses will be met by the applicant, who should state the amount he would be prepared to pay for the journals or monographs or photogram copies required, and, when possible, send a money order with his application or a reference to an agent who will meet the cost incurred.